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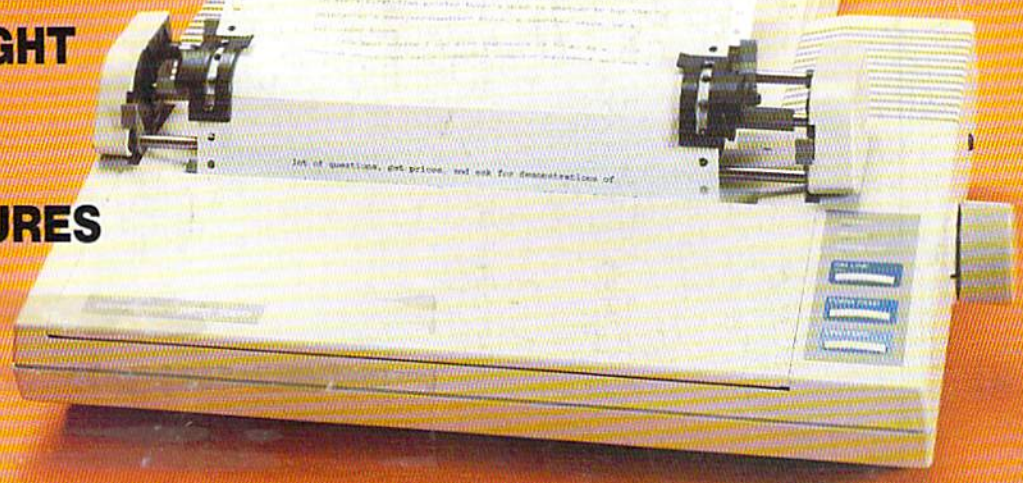

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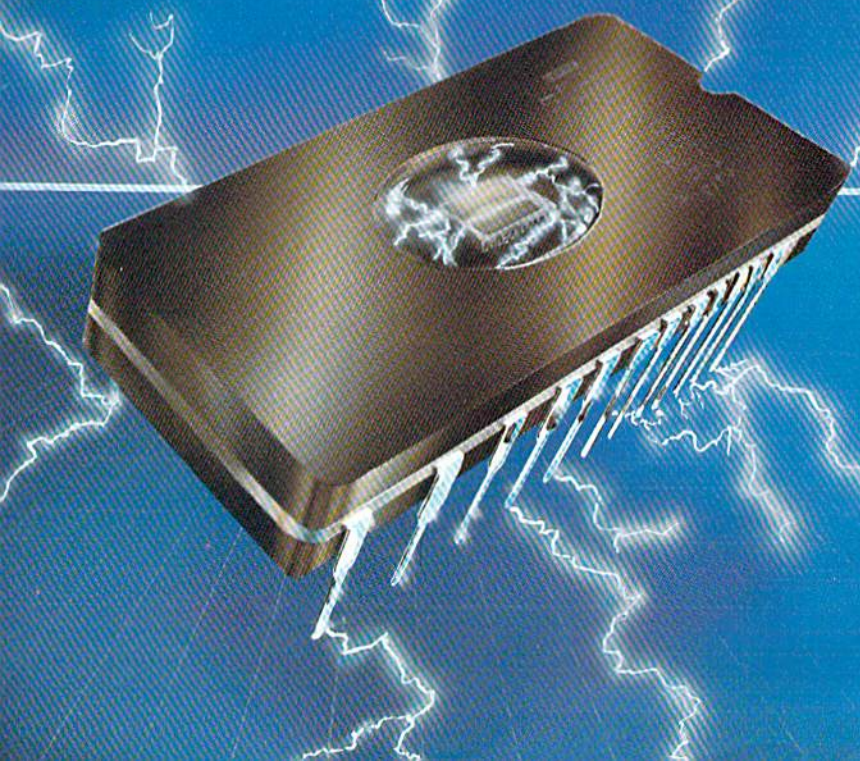

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Music Shop (BRODERBUND)	?	105 sec	105 sec*	109 sec*	21 sec
Hitchhiker's Guide to the Galaxy (INFOCOM)	?	70 sec	70 sec*	**	68 sec*
On-field Football (GAMESTAR)	?	159 sec	66 sec	63 sec	56 sec
EASY FINANCE I (COMMODORE)	?	58 sec	13 sec	13 sec	11 sec

* = Will not fast load — defaulted back to regular load
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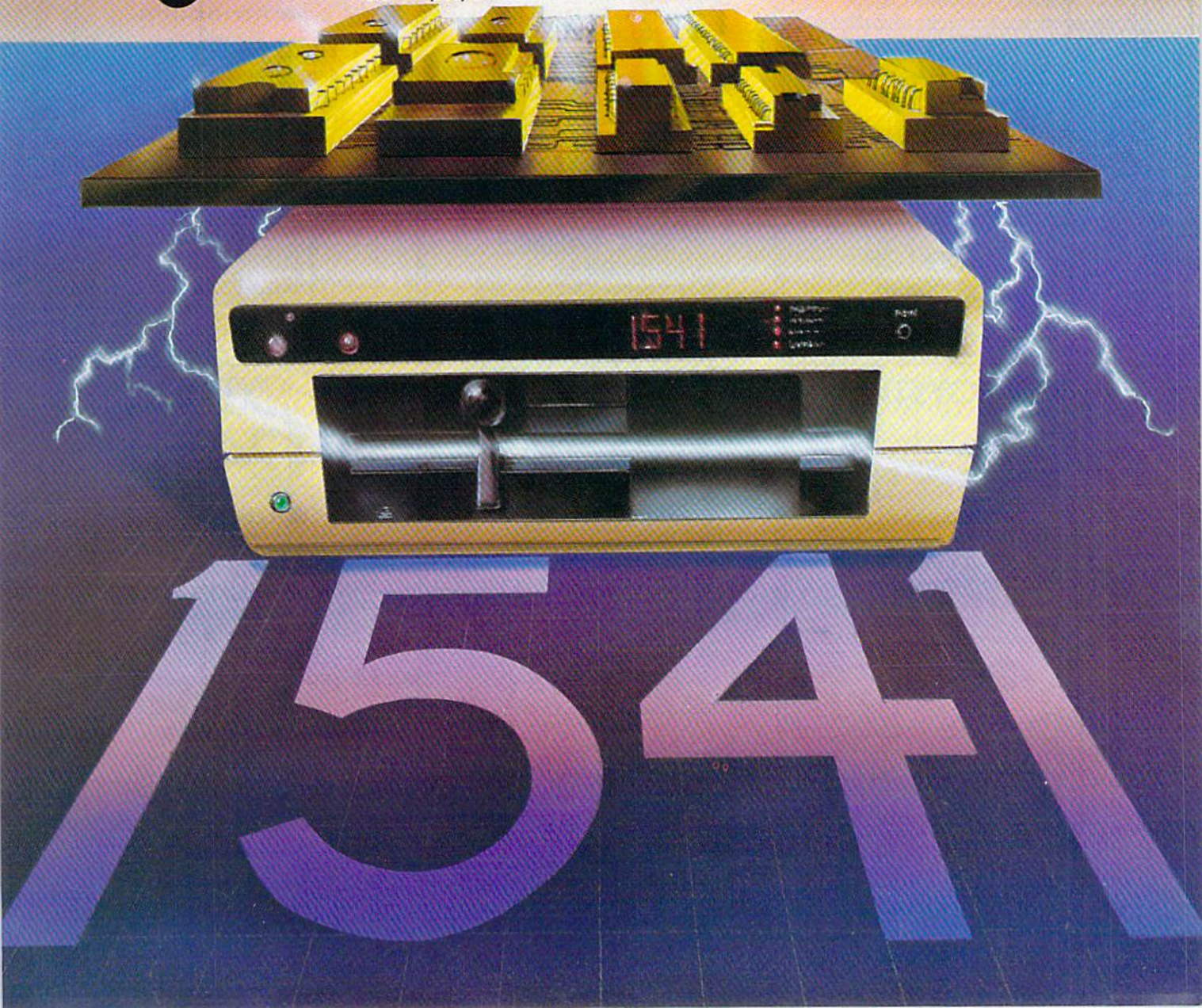

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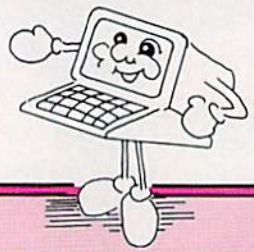

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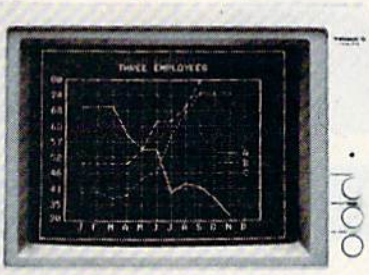

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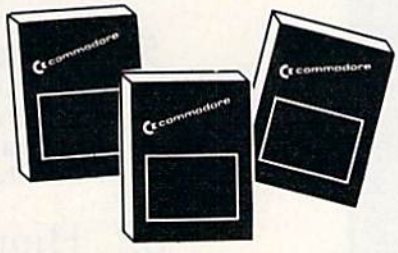

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May 1986 RUN Vol. 3, No. 5

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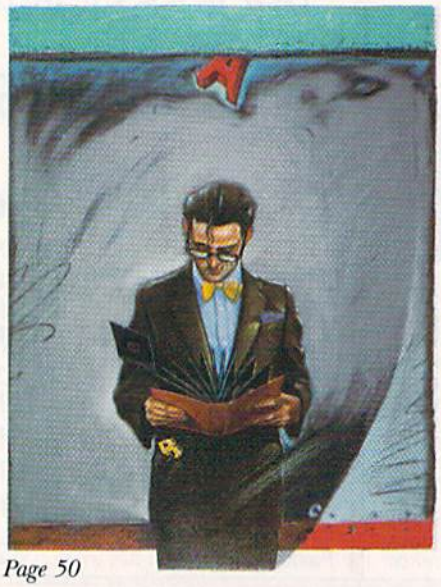

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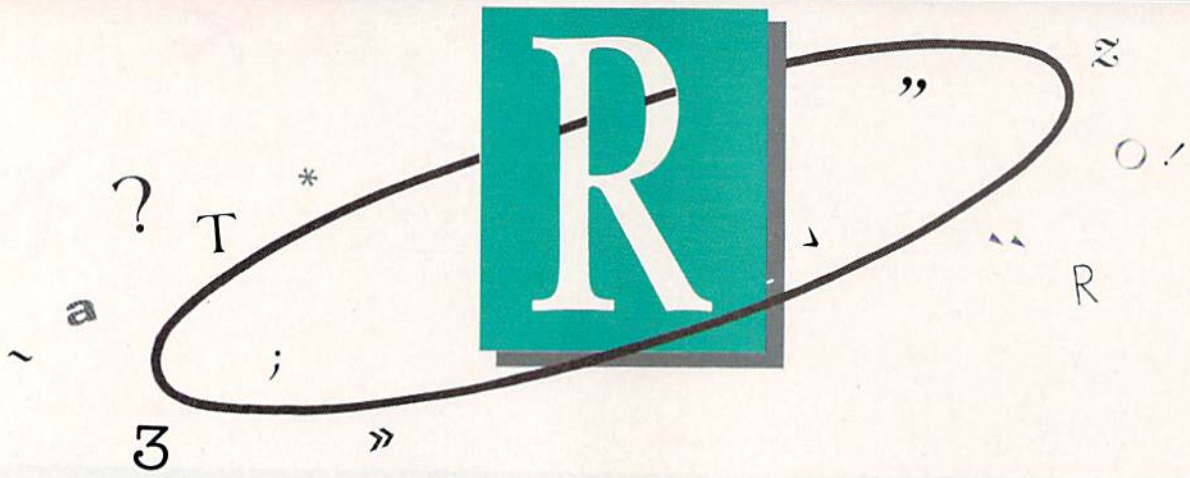
RUNNING RUMINATIONS



What's New from Commodore?

Commodore's recent release of several new products brought smiles of pleasure and anticipation to the faces of many software developers, dealers and users.

At the risk of upstaging *RUN*'s review and new product departments, I'd like to highlight several of these:

—Memory expansion cartridges. Are you familiar with the bouncing ball screen that has become a trademark of Amiga graphics? Well, now you can generate this, and other images, on the C-128! And the display is impressive.

Commodore's 1700 and 1750 plug-in expansion modules for the C-128 open up the possibility of using longer and more sophisticated programs and accessing them quickly.

The 1700 increases RAM by 128K, for a total of 256K on the 128. It will sell for about $175, depending on where you purchase it. The 1750 module contains 512K and sells for around $300.

It has been reported that these expansion modules do not work on some of the very first C-128 models issued by Commodore. If you own one of these early models, perhaps you'll want to put on your super sleuth cap and devise some sort of fix to solve the problem.

—Commodore mouse. We were also pleased to receive recently the long-awaited 1350 mouse. It is billed as a product for the C-128, but, depending on the software, it should work just as well with the C-64. This two-button mouse plugs into the joystick port and costs around $50.

Of course, what good is hardware without the software? It's now up to Commodore and software developers to create software that will take advantage of these products.

—GEOS. We have also recently received an advance copy of the GEOS operating system from Berkeley Softworks. In next month's issue, we'll be highlighting this product for the C-64. We'll put Commodore's new mouse through its paces to see how compatible it is with GEOS and how it controls the icons, pull-down menus and windowing features of GEOS.

—The Spartan. The on-again, off-again marketing campaign featuring the Spartan, the Apple II emulator for the C-64, is on again. In fact, I witnessed a demonstration of this product at the West Coast Commodore Show in San Francisco in early February.

The latest word from the manufacturer, Mimic Systems, is that the company is ready to ship units to distributors. The bugs have been exterminated and improvements have been added, thus opening the world of Apple II software to C-64 users. It appears that this time around, the dream may become a reality. We're anxious to receive a unit for review.

64 and 128 Coverage

We consider the introduction of the C-128 one of the major computer happenings in recent years. Commodore took the most popular home computer (C-64) and made it even better by the addition of an enhanced Basic, an improved keyboard, more memory, improved disk speed, 80-column display capability, C-64 compatibility and the capability of also running CP/M or C-128 software.

As expected, this computer has been well-received in the marketplace and by *RUN* readers. In a recent survey of readers, 78% of those who will purchase a new computer will choose the C-128.

Given, then, the excitement created by the introduction of the C-128, it is tempting to devote more coverage to this new computer.

We realize, however, that most of our current readers are C-64 owners, so the majority of our editorial content is, and will continue to be, C-64-related. In light of the compatibility of the 64 and 128, it is logical that they be covered in the same magazine.

Since the introduction of the C-128, *RUN* has devoted a little over a quarter of its editorial space to the C-128. We feel that this is in keeping with the readership of the magazine.

We want to attract new C-128 owners, but not at the expense of our current C-64 base. Commodore 64 owners can look toward *RUN* for continued support of their machine. At the same time, C-128 owners will find features and applications for their new machine.

db

New Bulletin Board Number

The *RUN* technical and editorial offices have recently changed locations, necessitating new phone lines and a new phone number for the RUNning Board. We invite you to give us a call at the new number, 603-924-9704, to find out the latest information about *RUN* magazine and the Commodore industry.

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VIZASTAR for the C128

Vizastar, the integrated spreadsheet, database and graphics program that has the Commodore 64 world raving, is now available for the C128. It boasts 80 columns, and has over 40K of free memory in the spreadsheet. Those who already own Vizastar 64 will be pleased to know that your existing files can be read by Vizastar 128. Also, you can upgrade to the 128 version. Call us for details and pricing.

"The only other comparable product would be Lotus 1-2-3 for the IBM PC; nothing in the C64 world comes even close to the features of Vizastar."
AHOY July 85

"I found Vizastar would do anything Lotus 1-2-3 could, and then some. It's my Commodore choice to become the standard against which the others will be judged."
INFO 64 Magazine, Issue #7

"Vizastar is an exceptional package that rivals the features of programs such as Lotus 1-2-3 and offers C64 owners the kind of integrated software previously only available for higher-priced systems."
RUN Magazine, June 1985

"I scrutinized, tested and experimented with Vizastar extensively, but could find no weaknesses whatsoever. It is the most comprehensive, most flexible, most powerful and easiest to use integrated software package I've worked with."
Commodore Microcomputer, Sept/Oct 1985

"I use an IBM PC at work with Lotus 123. I feel Vizastar is just as good and in someways better than 1-2-3."
Steven Roberson, NC. End User

"I have used Multiplan and Superbase; both are good pieces of software, but are inadequate when compared to Vizastar."
Jim Mathews, WA. End User

"So good, I bought a second C64 and Vizastar for my office. A wild bargain! You've saved me from having to buy IBM and Lotus."
Philip Ressler, MA. End User

VIZAWRITE CLASSIC for C128

This is the new word processor from Vizastar's author, Kelvin Lacy and is the successor to Omniwriter, which he also wrote. All the features of Omniwriter are there, plus many significant enhancements, like auto pagination, on-line help, pull-down menus, full-function calculator and more. Up to 8 'newspaper-style' variable-width columns can help with newsletters.

Three different proportionally-spaced "near letter quality" fonts are also built-in for use with Commodore or Epson compatible printers. You can merge almost any other word processor file directly into Vizawrite, including Paper Clip and Omniwriter. Naturally, it is also compatible with Vizastar. At all times, what you see on the screen is exactly the way it will be printed out. Vizawrite can do mail-merges and has an integrated 30,000 word spelling checker that you can expand yourself.

PROGRAM SPECIFICATIONS

Both Vizawrite and Vizastar are written in 100% machine language and run in the 128's FAST mode, making it lightning fast. They require a C128 with 80 column color or monochrome monitor. Both come with a cartridge, a diskette, and a reference manual. Vizastar also includes a 50 page tutorial book. Both work with 1541 or 1571 disk drives.

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Vizastar 128 is priced at **$119.97**. Vizawrite's price is **$89.97**. Vizastar 64 XL8 is now available for **$119.97**. We are so positive you will be satisfied with our programs that we offer a 15-day money-back guarantee. Try it Risk-Free. Call us today or send a check or money order. VISA/MC accepted.

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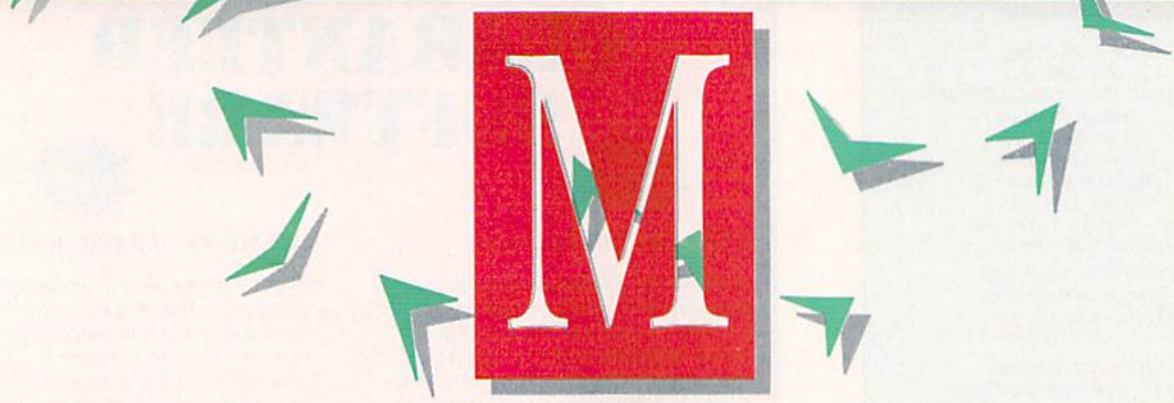

Compiled by LOUIS F. SANDER

MAGIC is tricks, MAGIC is fun. MAGIC is doing what cannot be done.

Every month, Magic brings you brief and useful computer tricks from around the world—tricks to make computing easier, more enjoyable or more exciting. We number our tricks in hex, the counting system of sorcerers and computerists.

Magic solicits your simple hardware ideas, short programs, useful programming techniques, little-known computer facts and similar items of interest. We look for new or recycled material that can be implemented with a minimum of time, effort or theoretical knowledge and that is of current value to Commodore computerists (Plus/4 and C-16 owners, too). RUN *will pay up to $50 for each trick accepted. Send your tricks to:*

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Moral: Magic manuscripts—mail 'em!

$2DE Disk rescue tab—Has one of your disks ever warped after a lengthy period of use, making it difficult to remove from your drive? If it's a copy-protected master disk, the situation is very uncomfortable.

To remove a warped disk more easily, put the disk into your drive, making a mark where its top edge extends through the front of the cabinet. Remove the disk, locate the mark and place a label or piece of tape there, folded to form a protruding tab. You can then use the tab to extract the disk when it gets stuck. Such a tab also makes your disk more visible in its box, so it's easy to find when you need it.

Mike Rogalski
Pasadena, CA

$2DF C-128 disk operations—Some of Basic 7.0's disk commands give trouble when you try to use them with string variables in their arguments. If you put your string variables inside parentheses, your troubles should vanish like magic. Another good solution is to operate on the variables before using them. Any of these should work:

```
DOPEN#1,"FILENAME"
DOPEN#1,(F$)
DOPEN#1,"" + F$
```

Jerry W. Jarvis
Spokane, WA

$2E0 C-128 mode switcher—When I replaced my trusty C-64 with a new C-128, it was difficult to keep track of which of my many disks were for C-64 mode and which were for Basic 7.0. I solved the problem by using the 1571's auto-boot feature to load and run this program for my C-64 disks.

```
100 REM SWITCH TO C-64 MODE
110 SYS 65357
```

C. David Moran
Ridgefield, NJ

$2E1 Testing for 128/64 mode—The following line tells a program whether it is running in C-64 mode or C-128 mode. It works because FRE(0) and FRE(1) on the 64 always return the same value; while in 128 mode, they return the amount of bytes free for program and variable storage, respectively. It's possible, but highly unlikely, for both to be equal in 128 mode. After the line is executed, variable M will contain a 128 or a 64, depending on the machine you're using.

```
100 M = 128 : IF FRE(0) = FRE(1) THEN M = 64
```

Edward Horgan
Coatesville, PA

$2E2 C-128 RGBI connector—Be careful when making cables for this connector, because the pin diagram in the manual is incompletely labeled. Pin 1 is always at the end of the longer row, but it can be on your left or your right, depending on whether you're looking at the pin end or the solder-terminal end of the connector, and on whether your connector is female or male.

Circle 2 on Reader Service card.

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Before connecting any wires, you should carefully determine the location of pin 1, then mark it unmistakably. The other pins will then be easy to find, and your chance of error will be greatly reduced.

Most connectors have tiny pin numbers molded into the plastic, and checking them is the surest way to locate pin 1. You can also rely on this advice: If you are looking at the solder-terminal end of the connector, with the longer row of pins on top, pin 1 is on your right for a male connector and on your left for a female connector.

Ron Hall
Duncan, OK

$2E3 Using C-128 windowing—If you set a two-inch window at the top of your C-128 or Plus/4 screen, you can improve your speed when typing in programs. Set the window, then rest your magazine on the front of the monitor, with its top edge just below the window's lowest line. Since your cursor will never go below the window, you can simultaneously see the magazine and your own typed material.

Brad J. Taylor
Clarksville, TX

$2E4 C-128 Input prompt—To suppress the question mark, use POKE 21,64. Immediately following the Input statement, use POKE 21,0 to return the system to normal. If you don't make the second Poke, your system will operate erratically.

Edward B. Sullivan
Branson, MO

$2E5 Viva VIC-20!—If you have an old VIC-20 and a new C-128, you can use them both at once. The VIC sits nicely on the 128's back shelf, and its video cable plugs into the front of the 1702. Keep everything plugged in, using the 1702's back panel switch to select the display you'd like to see. To ensure good air flow through both computers, you can raise the VIC slightly on some sort of improvised feet.

Stanley Smith
Gladwin, MI

**$2E6 Magic C-64 clock**—This program is longer than our customary one-screen limit, but we think you'll be glad we printed it. It uses the seldom-used Time of Day clock to feed a continuous screen display. The TOD clock keeps much better time than TI$, and it isn't affected by other computer operations.

Running the program will start the clock, and nothing short of turning off your computer will stop it. Resets and stop/restore presses will kill the display without affecting the timekeeping. To return the display to life, execute a SYS40822.

```
10 PRINT"{SHFT CLR}{2 CRSR DNs}MAGIC CLOCK
   - FLOYD ANDERSON - SYS4822"
11 POKE55,118:POKE56,159:CLR
12 FORJ=0TO137:READK:L=L+K:NEXT:RESTORE:IF
   L<>11465THENPRINT"DATA ERROR":STOP
13 FORJ=0TO137:READK:POKE40822+J,K:NEXT
14 INPUT"{2 CRSR DNs}HR,MIN,SEC,AM/PM";H,M
   ,S,A$
15 IFH>12ORM>59ORS>59THEN140
16 IFH>9THENH=16+(H-10)
17 IFM>9THENM=16*VAL(LEFT$(STR$(M),2))+VAL
   (RIGHT$(STR$(M),1))
18 IFS>9THENS=16*VAL(LEFT$(STR$(S),2))+VAL
   (RIGHT$(STR$(S),1))
19 IFLEFT$(A$,1)="P"THENH=H+128
20 POKE56331,H:POKE5633,M:POKE56329,S:POK
   E56328,0:SYS40822:END
21 DATA 120,169,131,141,020,003,169
22 DATA 159,141,021,003,088,096,169
23 DATA 058,141,029,004,141,032,004
24 DATA 141,035,004,169,013,141,039
25 DATA 004,173,011,220,041,128,240
26 DATA 007,169,016,141,038,004,208
27 DATA 005,169,001,141,038,004,173
28 DATA 011,220,041,016,024,074,074
29 DATA 074,074,105,048,141,027,004
30 DATA 173,011,220,041,015,024,105
31 DATA 048,141,028,004,173,010,220
32 DATA 041,240,024,074,074,074,074
33 DATA 105,048,141,030,004,173,010
34 DATA 220,041,015,024,105,048,141
35 DATA 031,004,173,009,220,041,240
36 DATA 024,074,074,074,074,105,048
37 DATA 141,033,004,173,009,220,041
38 DATA 015,024,105,048,141,034,004
39 DATA 173,008,220,024,105,048,141
40 DATA 036,004,076,049,234
```

Floyd L. Anderson, Jr.
Niantic, IL

$2E7 Modem hearing aid—Sometimes you make a modem call and fail to get a carrier. Since most modems don't let you listen in on the line, you can't tell if you're getting a busy signal, a ring with no answer or something else. Worse, modems with the auto-redial feature can be repeatedly answered by an angry human voice.

To hear what your modem is receiving, use a telephone pickup such as the Radio Shack #44-533, which you can plug into any handy amplifier. Move the pickup around on the telephone or modem until you get a useful signal.

Many portable tape recorders can act as amplifiers for this purpose, if you plug earphones into the earphone jack, put a blank tape in the recorder and press the play and record buttons. The pause button will often stop the tape, but not the amplification.

Craig Edward Given
Chattanooga, TN

$2E8 Remembering power-up sequences—In our school, all children greet their Commodore by saying "My Dear Computer." This reminds them to turn on the monitor (My), then the disk drive (Dear) and, finally, the computer (Computer). When leaving the computer, they say "Computer, Don't Move." This, of course, reminds them to turn everything off in reverse order.

Continued on p. 90.

Circle 109 on Reader Service card.

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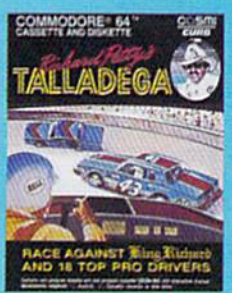

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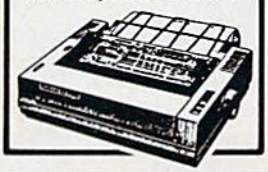

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This Program Will Help You Manage Your Investments

Personal Portfolio Manager allows you to keep track of both short- and long-term investments, maintain tax records and generate tailor-made reports on your portfolio. Even a certain amount of financial analysis is possible.

One of the unique features of this program is that it contains a built-in terminal program, optimized for connecting to such financial databases as Dow Jones News/Retrieval and Warner Computer Service.

The documentation is impressive. More than 80 pages explain the operation of the package in detail.

Entering the initial data is a relatively straightforward process, although it does take some time.

Once you've entered your data, you can create and print out reports based on that information. You can either customize the reports or use one of several standard forms included with the program. If you decide to create your own reports, you'll have to get involved with some mathematics, which the reference section helps you with.

As you probably know, financial information is available through many on-line computer networks. With most financial software, you must input the updated stock quotes yourself. The terminal program integrated into Personal Portfolio Manager makes this a snap, but you'll have to subscribe to either the Dow Jones News/Retrieval or the Warner Computer Service to use the automatic quote-gathering system.

You may use the quote-gathering software on an on-demand basis, or you can specify a particular time each day for the program to make the call for you (with an auto-dial modem, of course).

Since the financial services often include news reports, Personal Portfolio Manager's terminal program includes an 8000-character buffer for saving news items and reading them off-line. The program can even be used for checking into the local bulletin board.

You may use either one or two disk drives and the VIC Modem, 1650 or 1660 modem. The manual claims compatibility with any properly interfaced printer. I tested Personal Portfolio Manager with both a 1525 and MPS-801 printer, with good results.

Whether your investments include stocks, options, bonds, mutual funds or treasury bills, Personal Portfolio Manager will help you make the most of your money. *(Abacus Software, PO Box 7211, Grand Rapids, MI 49510. C-64/$39.95 disk.)*

Jim Grubbs
Springfield, IL

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

Hardball!

A

This Superb Sports Simulation Delivers Major League Excitement

Simply stated, Accolade's Hardball is one of the best sports simulations ever created. Not only does the game feature graphics that look like NBC's Game of the Week, but its realistic action and extensive play options give it the depth necessary to sustain long-term interest.

You can play Hardball against a friend or against your C-64, with either side the home team. Virtually all functions are under joystick control.

There is a total of eight pitches, including fastballs, offspeeds, sliders, sinkers, screwballs and curves. However, each of the pitchers on your roster is expert in only four pitches. After selecting a pitch, you use the

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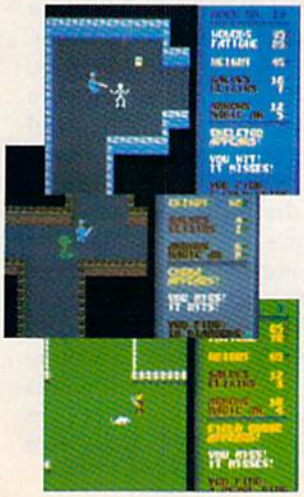

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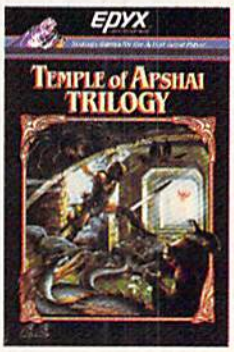

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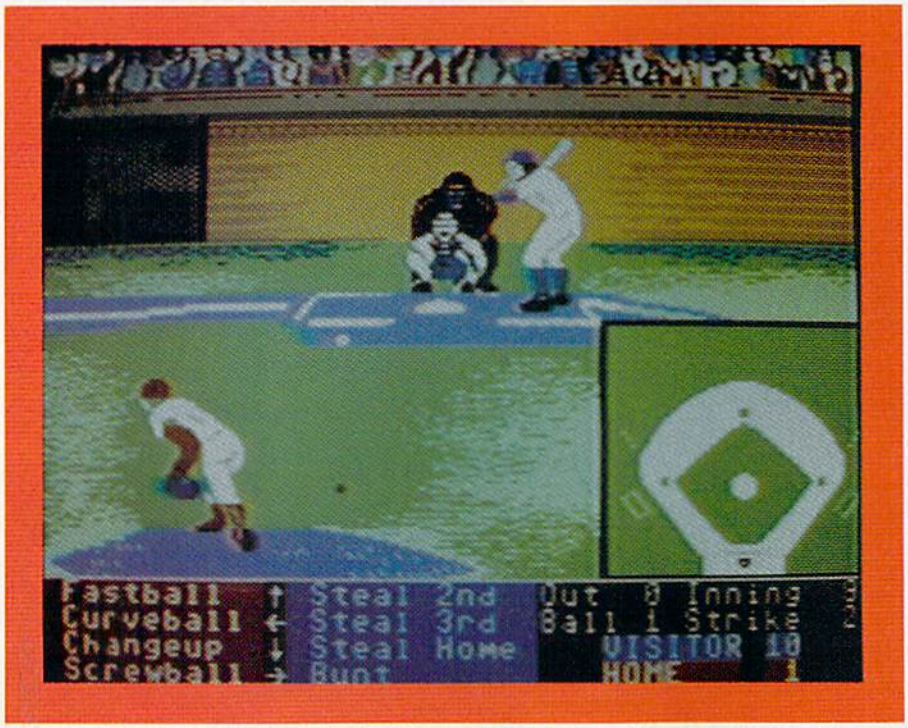

Hardball!, from Accolade.

joystick to determine where you'll direct the ball.

If the pitch is over the plate, the word *strike* appears from out of the umpire's mouth as he gestures the call. If the ball is hit, it's time to get the fielders in on the action.

As the ball leaves the hitter's bat, the camera angle shifts from the classic behind-the-pitcher view to a wide shot of the outfield. The fielder closest to the ball begins blinking and is suddenly under joystick control. When a fielder catches the ball, you press the fire-button and move the stick in the direction you want the ball thrown. Even double and triple plays can be made with ease.

Just as in real baseball, the most difficult part of being up at bat is waiting for your pitch. Whether or not you make solid contact with the ball will depend upon your timing and your judgment of the pitch.

If you hit the ball, your player automatically runs toward first base; however, from there it's up to you to decide whether or not to try for second base. In fact, the only fault I can find with Hardball is that if you do decide to head for the next base, there's no turning back.

There are several big league options available from the Manager's Decision screen, which you call up and exit by pressing the space bar. At bat, you may choose to send in a pinch-hitter through player substitution or by exchanging positions. The team in the field can use the Manager's Decision screen to send in a relief pitcher, shift the outfield left or right, set the infield at normal or double-play depth, or intentionally walk the batter.

To help you make informed managerial decisions, batters' averages are displayed as they step up to the plate and statistics on other players are available from the Decision screen. Some of the game's other realistic features include a conventional baseball scoreboard, extra innings, foul tips, home runs and starting pitchers whose accuracy fades in the late innings.

Hardball is a perfect blend of action and strategy with first-rate graphics, sound effects and music. It is required playing for sports fanatics as well as anyone interested in state-of-the-art entertainment software for the C-64. *(Accolade, 20863 Stevens Creek Blvd., Cupertino, CA 95014. C-64/$29.95 disk.)*

Bob Guerra
Charlestown, MA

Stickybear Math and Stickybear Reading

B

These Programs Help Your Child Practice Some Basic Skills

Stickybear Math and Stickybear Reading are top-notch drill programs for primary school children. The reading program is for children of ages five to eight, and the math for six to nine. Both programs are charming, well-designed and fun.

A lengthy disk-access time may make children impatient, but, while I'd prefer a faster response, this problem is a natural result of the excellent high-resolution graphics.

Stickybear Reading is a little more difficult to use than Stickybear Math, and children will need some parental help.

Stickybear Reading includes three modules: Matching Words and Pictures, Fill in the Blank and Modular Sentences. Even a child who barely knows how to read can learn new vocabulary, because the program won't let him make a mistake. When the child enters an incorrect answer, the computer makes an unpleasant sound. The child never has more than three choices, and when he inputs the correct response, he is rewarded with approving noises from the computer. This correct answer is displayed long enough for the child to fix it in his mind.

The Find the Words and Build a Sentence modules both offer delightful and effective animation. For example, you see a screen in which a cow jumps over Stickybear. The child makes a selection from the words *sheep*, *skunk* and *cow* to fill in the blank. While the child is learning the word *cow*, he's also learning the phrase *jumps over*.

The sentence game provides the child with subjects, verb and adverb combinations and objects. Any combination of these three elements works, although some sentences are unlikely. After the child completes

COLOSSUS CHESS IV

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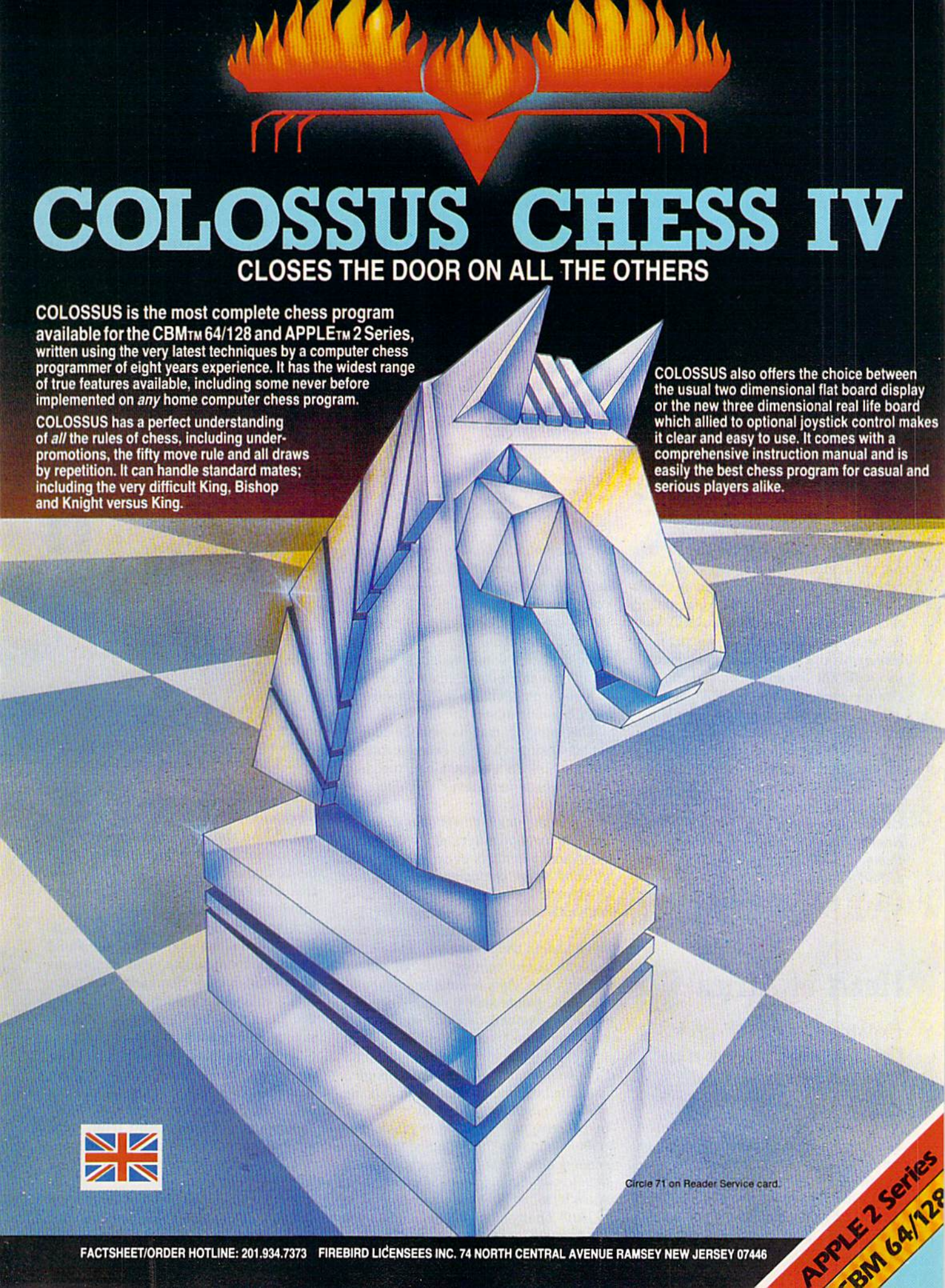
COLOSSUS is the most complete chess program available for the CBM™ 64/128 and APPLE™ 2 Series, written using the very latest techniques by a computer chess programmer of eight years experience. It has the widest range of true features available, including some never before implemented on *any* home computer chess program.

COLOSSUS has a perfect understanding of *all* the rules of chess, including under-promotions, the fifty move rule and all draws by repetition. It can handle standard mates; including the very difficult King, Bishop and Knight versus King.

COLOSSUS also offers the choice between the usual two dimensional flat board display or the new three dimensional real life board which allied to optional joystick control makes it clear and easy to use. It comes with a comprehensive instruction manual and is easily the best chess program for casual and serious players alike.



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APPLE 2 Series

CBM 64/128

the sentence, the program moves to an animation screen that shows the sentence in action.

Stickybear Math features 20 levels of practice in addition and subtraction. Correct answers help to construct a bridge to save Stickybear, who appears after every few problems to let the child know how much of the bridge he's built.

Two features really distinguish this program. The first is that on the levels where the problems involve small numbers, the designers have built set theory into each screen. For example, in an addition problem, the screen might have five inchworms above the number five and four above the four. When the child types the correct answer, the inchworms crawl across the screen to make a group of nine above the answer.

The other exciting feature is the parent's ability to set program parameters. The disk can hold individual files on up to 24 children, recording the progress of each. Thus, if the child is bored with his present level, or if the problems have become too difficult for him, the parent can change these parameters.

Drill programs are not the most exciting educational software available, but they are valuable, especially for children who need extra time with basic skills. Stickybear Reading and Stickybear Math are excellent choices to meet this need. *(Weekly Reader Family Software, 245 Long Hill Road, Middletown, CT 06457. C-64/ $29.95 disk.)*

Annette Hinshaw
Tulsa, OK

Heart of Africa B

Explore Africa in Search Of Adventure, Riches and A Pharaoh's Lost Tomb

Because of your "uncommon worthiness," you have been selected by the attorneys of the late Hiram Perkins Primm to carry on his life's work of exploring Africa. You will be given Primm's notes on Africa, $250 and passage to Cairo aboard the African Queen. From the time of your arrival in January 1890, you'll have five years to find the legendary lost tomb of Pharaoh Ahnk Ahnk. If you succeed, you will inherit Primm's estate. If you fail, your successor will be instructed to give you a proper burial—should your earthly remains be located.

Your adventure begins in the port city of Cairo. Like the other port cities you'll visit on your expedition, such as Berbera, Zanzibar, Boma and Lagos, Cairo contains shops where you can buy the supplies you'll need in your travels. You'll also want several gifts to offer the tribesmen of various villages in exchange for directions to the chief's hut. Also available in each city is a travel agent who can provide passage from one port city to any other.

Since you can have only one object in hand at a time, you'll always want to use the item that's most appropriate to your surroundings, such as a canteen while crossing the desert. When not holding any other object, it's a good idea to keep some type of weapon handy for protection. Just be sure not to walk into a village with a pistol in your hand. It upsets the natives.

During your travels, you'll encounter charging rhinos, deadly insects and poisonous snakes. Unfortunately, these events are never depicted on the screen.

If you're lucky, you'll also discover such natural wonders as great waterfalls and perhaps even some large gold or silver deposits. As you make discoveries, the information is automatically chronicled in a diary for future reference. In addition, if you have a map, the areas you explore are colored in to remind you of where you've been. As a reward for your discoveries, funds will be wired to you when you return to a city so that you may continue your expedition.

By studying the notes left by Primm, you'll gain valuable insights into the language and customs of the various tribes you'll encounter. Then, by offering an acceptable gift to the tribal chiefs of the villages, you may receive clues that will help you locate precious metals, jewels or even Ahnk Ahnk's tomb. Without this help, there is little chance of success and you'll be destined to perish in the searing desert or become hopelessly lost in dense jungle.

Heart of Africa is an entertaining safari into the jungles, deserts and mountains of the mysterious continent of Africa. From geographical landmarks like Mount Kilimanjaro and Lake Chad, to tribes such as the Ugandi and the Zulu, Heart of Africa is a fascinating lesson in social studies. It's a living textbook where people, animals and natural wonders come alive, and your survival depends on how well you've studied. *(Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. C-64/$32.95 disk.)*

Bob Guerra
Charlestown, MA

Paperback Writer 128 B

A Powerful Word Processing Package For Your C-128

Although Paperback Writer was originally written for the C-64, it makes an easy transition to the C-128 and, in the process, becomes even more powerful.

The program utilizes the C-128's 80-column format, the fast (2MHz) speed and the autoboot feature. The documentation seems still to have been written for the C-64, with new features exclusive to the C-128 mode set aside in boxes.

After autobooting, the Paperback Writer presents you with a menu of printers from which you can input your brand. Unfortunately, you must make this choice each time you use the program, as there is no way to save it to the master disk.

In the Write/Edit mode, a command box above the text area gives you a list of major routines. Pressing the Commodore key flips you into a sub-menu of choices and from here all commands are alphabetic and one-key, making the functions easy to remember and use.

With a whopping 64K of free memory left after booting, you're not likely to run out of room for docu-

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ments or files. However, if you suspect you're getting close, pressing CTRL-M shows how much room you have left. If you are working on a very long manuscript, you can link files together.

Along with giving you a large working memory, Paperback Writer allows you to divide the memory into two files of 32K each. Both run concurrently and you may swap information from one file to the other.

Paperback Writer offers such printing options as italics, boldface, super- and subscripts, all of which you see on the screen exactly as they will appear on paper.

Formatting of text is done from an extensive menu of commands. It is here, as well as in flipping between various menus, that the speed of the C-128 comes into play, for the changes you make are almost instantaneous.

Paperback Writer also contains a spelling checker, but you must create your own dictionary. I'm not sure why, but this must be done in 40-column mode.

Paperback Writer 128 also offers such features as search and replace; block move and block delete; Numeric mode for automatic alignment of numbers; and a DOS wedge.

The only limitations I found are the inability to save either your printer information or your choice of screen colors. Saving these so that they become default parameters would make a good word processor even better.

Those drawbacks aside, my overall recommendation is high. If you're ready for 80-column word processing and you're looking for a piece of software that shows off the power of your new computer, then Paperback Writer 128 is worth your consideration. *(Digital Solutions, PO Box 345, Station A, Willowdale, Ontario, Canada, M2N 5S9. C-128/$49.95 disk.)*

Ervin Bobo
St. Peters, MO

The File Converter

Say Good-Bye to The Problem of File Incompatibility

B

No matter how much you treasure your word processing or database program, a new package eventually appears offering more features or faster operation. You'd like to use this new package, but hesitate because of the problem of file incompatibility between programs.

The File Converter provides a solution to this problem. It's a handy utility that allows you to automatically convert files, read relative files and speed up database entry.

Using a built-in template or one of your own design, The File Converter will read almost any word-processing file, strip away unnecessary characters, convert the format and write a

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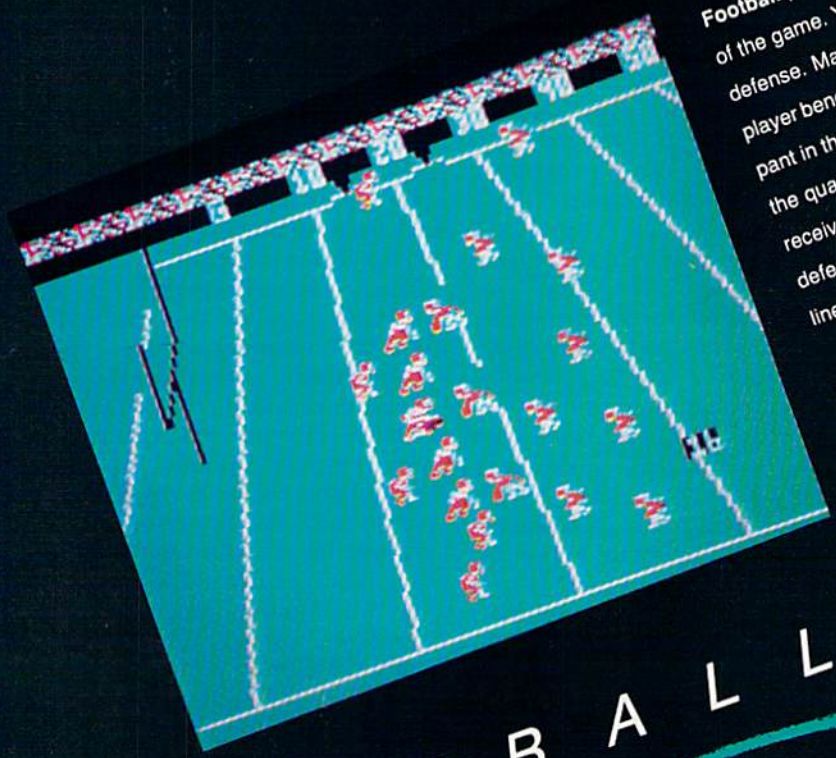

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new sequential file that can be read by your word processor. The converted file can be viewed on the screen or sent to the same disk as the original or to any other disk drive.

Rewriting database files presents more of a problem; you must first understand how your program organizes its files and how the new records are written. Record lengths may be fixed or variable. Disk files may be program, sequential, relative or random. Delimiters to mark the beginning and end of fields will vary, as may the number of fields in the old and new versions of your file.

The process isn't as complicated as it may sound, and, fortunately, the documentation is comprehensive and easy to follow. If you're the least bit computer literate, you should be able to use this program successfully.

Once you've entered the proper conversion values into the program, you can save the newly created template to disk. You may be surprised to discover that The File Converter also allows you to create new fields, eliminate old ones, reorganize records and add non-printing characters to the beginning of each record.

Two other handy utilities included are a relative-file reader, which allows you to inspect and print out relative files, and a batch-entry program, which speeds keyboard entry of database records.

The Fast Entry program included with The File Converter offers an innovative solution to the problem of the slow speed of Commodore disk drives. After you've set up a format with fields corresponding to the records in your database, you can enter data while the disk drive works independently. Records are still saved after you've typed them, but you'll no longer have to alternate between keyboard and disk operations.

Fast Entry also gives you several clever options that help you along. If, for example, you must enter hundreds of names and addresses for a mailing list, Fast Entry will automatically number each record; enter designated fields; move to the next field without a carriage return; and repeat specified fields from record to record.

Data entered with Fast Entry can be written in either Flexfile or Superbase format. To use the data with some other database program, you must first run the output file through the converter program.

The opportunities that The File Converter extends to Commodore users are virtually endless. Along with providing compatibility among Commodore-specific software, you can also reformat ASCII data from other computer systems.

Of all the utility programs available for the C-64, The File Converter may not be the one you use most often; however, use it once and you'll never want to be without it. *(Applied Technologies, Lyndon Way, Kittery, ME 03904. C-64/$39.95 disk.)*

John Premack
Lexington, MA

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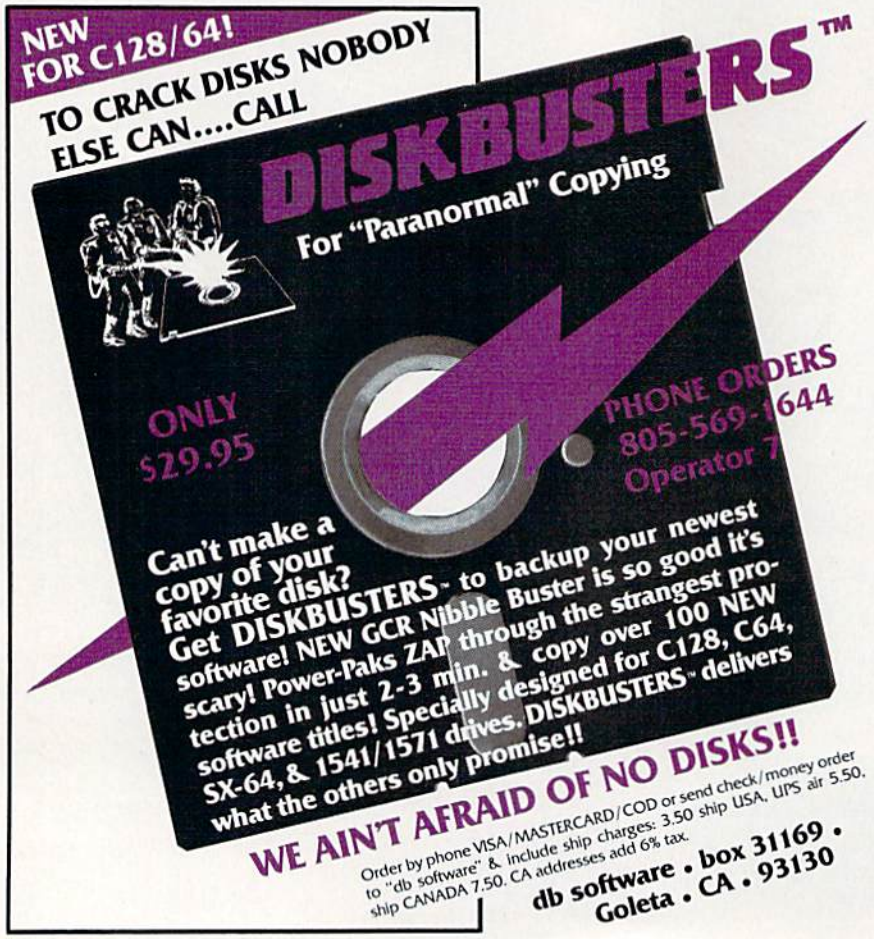
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If you have been looking very long, you have probably discovered that there are just too many claims and counter claims in the printer market today. There are printers that have some of the features you want, but do not have others. Some features you probably don't care about, others are vitally important to you. We understand. In fact, not long ago, we were in the same position. Deluged by claims and counter claims. Overburdened by rows and rows of specifications, we decided to separate all the facts — prove or disprove all the claims to our own satisfaction. So we bought printers. We bought samples of all the major brands and tested them.

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Our search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is our SP-1000 manufactured by a Division of Seiko, the world class manufacturer of many fine products from Japan. We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing at a respectable 100 characters per second, and with a very readable 12 (horizontal) by 9 (vertical) character matrix. This is a full feature, bi-directional, logic seeking, true descender printer.

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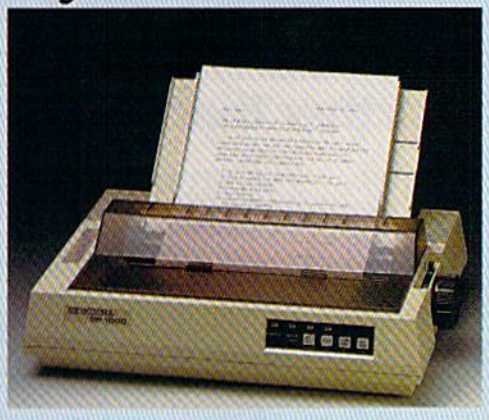

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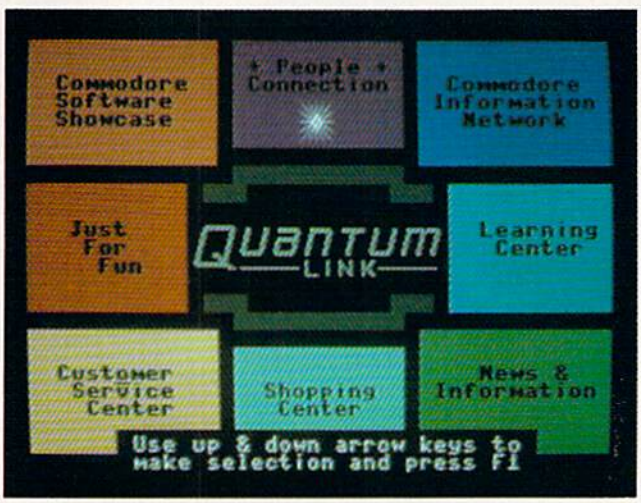

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IN SEARCH OF THE

By TIM WALSH

This RUN *editor braved the wilds of printer-dom to give you a first-hand account of what's available and how to choose the printer that best fits your computing needs.*

If you need a computer, there's a good chance you also need a printer. The best printer for your computer system is not necessarily the most nor least expensive. It is the one that best satisfies your printing needs.

Therefore, it is of utmost importance that you know your needs before you buy. If you don't, you could end up with a printer that is not compatible with the software you intend to use with it. For instance, a letter-quality printer is fine for use with a word processor, but it can be practically useless with spreadsheets and other software that utilize graphics characters to create pictorial representations of data.

My primary objective in this article is to help you clearly determine what features to look for in a printer, based on your present and anticipated needs. My second objective is to introduce inexperienced *RUN* readers to a few currently available Commodore and non-Commodore printers, and to discuss their features. (Next month, we'll publish the second part of this article, in which I'll examine the Commodore MPS 1000, along with other printers that can be used with Commodores.)

I have set up some guidelines to help you streamline the selection process when choosing a printer.

Printer-Selection Guidelines

First, after determining your fundamental printer needs, sit down with pencil and paper and list them. Jot down some simple questions, such as the following, and try to answer them.

Are you going to be using your printer mainly with programs of your own design? If so, the least expensive, second- or third-hand dot-matrix printer you can find will probably be adequate.

Are you going to do a lot of professional or business correspondence with a word processor? If so, you'd be wise to invest in a good letter-quality daisywheel printer, to provide you with professional-looking correspondence.

Will you be working a lot with spreadsheets and databases? Business software dictates an investment in a high-quality dot-matrix printer that is fully compatible with both the software and the Commodore computer system you're using. Each of your software's features that cannot be accessed by the printer reduces your software's overall usefulness.

Once you've determined your printing needs, you're ready to start shopping. Then arises a most pressing question for all first-time buyers: Should you buy your printer at a mass-merchandise outlet, a computer store, or a mail-order house?

I advise beginners to go to a computer store that sells Commodore equipment and ask a lot of questions. Ask for demonstrations of printers in conjunction with a variety of software products; and get prices. If the printer of your dreams is sold and serviced by the dealer, you'll probably be best off buying your printer there—unless, of course, you can get the same model at a mass-merchandiser at a better price.

If no computer store is conveniently nearby, search the mail-order magazine ads for printers. It usually won't cost anything extra to order your printer and other equipment by phone, as most of the large mail-order houses publish toll-free numbers. Of course, you risk the possibility that the printer you ordered won't work, and you might encounter additional expense in sending it back for a replacement.

Before buying a printer, you might want to consider purchasing a printer stand. They cost from $20 to $100 at furniture and computer stores, and are frequently on sale. Those that prop up the printer a few inches above the table are helpful space savers, because they allow you to utilize the bottom-feed function of any printer that has that feature.

PERFECT PRINTER

When you purchase your printer, be sure to order a few extra ribbons and, if it's a daisywheel printer, a few extra print wheels. The ribbon that comes with the printer may have dried out a little from spending a long time in a warehouse. The added insurance of a few extra print wheels is easily realized on a Sunday evening when all the local stores are closed and the "a" cracks in half during the printout of a report due on Monday morning.

It's during the selection process that you'll have to choose between a parallel and a serial printer. If you opt for the serial design, you'll only have to contend with the serial cable, which plugs into the rear of your disk drive or computer.

If you get a parallel printer, however, you'll need to buy a Commodore-compatible parallel interface for connecting the printer to your computer system. Be sure to get an interface with graphics capability if you're going to be using software that creates graphs.

Bear in mind, however, that a parallel interface with graphics capability does not guarantee 100% software compatibility. There are too many hardware variables involved, especially with some of the older interfaces. Even though parallel interfaces usually specify the printers with which they're compatible, it's still a good idea to see a demonstration of its graphics capability with the printer you intend to buy.

Following is an exploration of some printers, both Commodore and non-Commodore. Commodore now offers three models—the MPS-803, DPS-1101 and MPS-1000. The popular MPS-801, MPS-802 and 1526 dot-matrix printers have all, unfortunately, gone the way of the buffalo nickel.

Commodore MPS-803

This is the least expensive dot-matrix Commodore printer you can buy. Reading the 803's accompanying owner's manual makes it apparent that Commodore had a good understanding of this printer's target audience—beginners. The manual discusses everything from setting up the printer to sending control codes to activate the unit's print features. There are plenty of examples detailing how to perform various print functions and how to incorporate print routines into your Basic programs.

I use an MPS-803 regularly for the testing of programs for *RUN*, and have become rather critical of its shortcomings, which include the lack of a tractor-feed unit as standard equipment, an inability to produce mailing labels efficiently, a slow (60 cps) print speed and a feeble character set that lacks descenders.

Yes, you can load continuous-feed paper into the unit without a tractor feed, but don't expect to print more than one or two pages without the paper becoming tilted to the left or right. Without a tractor-feed unit, creating mailing labels on the MPS-803 is a "maybe" proposition at best. Maybe you'll have good luck producing a few labels at a time, but forget about the effortless creation of a steady stream of them. But, as mentioned earlier, this printer was designed to be used by a beginner in a home environment.

One item worth mentioning about the MPS-803 is that it employs a cartridge instead of a spool ribbon. This is atypical of Commodore. The earlier low-end Commodore printers, such as the 1525, used traditional ink-spool ribbons. It's comforting to see Commodore using some of the newer printer-design technology on the MPS-803.

Commodore's MPS-803

Also on the plus side, the unit does a fair job of emulating a Commodore 1525 printer, although the commands used in opening and activating the print channels do vary slightly between the two printers. This variation in commands is significant enough so that you can create a print routine that will work on the 1525, but not on the MPS-803. The positive aspect of this variation is that

it gives 803 owners an opportunity to learn the fundamentals of programming printers by having to modify some programs.

High- and low-resolution screen-dump programs designed for the 1525 easily circumvent any variations between the two printers, and will work well on the MPS-803. The hard-copy reproduction of screens created by the 1525 will have roughly the same overall dimensions as those formed by the 803. However, there is usually a marked difference in appearance, because, although the 803 shares the same default size of line spacing, it has a smaller character set, resulting in a larger gap between lines.

If you want to learn the science of programming printers, look no further than the MPS-803.

Is this printer for you? If you want professional-looking text, speedy output and a wide range of print features, you'd do better with another choice. However, the MPS-803 does have its strengths. It has an attractive price (about $100 or less); its owner's manual is packed with helpful information detailing its capabilities; and its small size saves desk space.

If you're a beginner on a budget and want to learn the science of programming printers, look no further. This printer was made for you.

Commodore DPS-1101

Here is a big and brawny letter-quality printer from Commodore. The popular DPS-1101 has been on the market for about a year and a half, and the fact that several mail-order outfits are offering it for around $260 is helping it win a strong following.

The DPS-1101 has an appearance of high quality compared to Commodore printers such as the 1525, 1526, MPS-801 and MSP-802. With overall dimensions of 24 × 7 × 13.5 inches and a weight close to 30 lbs., it's a hefty piece of hardware.

Operating the DPS-1101 is a breeze. The user's manual is filled, in typical Commodore fashion, with enough sample programs to keep you busy trying out the printer's features for a week. A serial cable connects the printer to your computer system, and it is that same cable that, unfortunately, makes this printer incompatible with other computers.

Commodore's DPS-1101

The DPS-1101 is very noisy in operation, emitting a constant and pronounced whirring, whistling, chirping and clacking. Be forewarned: Use of this printer at night is guaranteed to awaken the children, pets and nearby neighbors if precautions are not taken to use it in a sound-proofed location.

Replacing the DPS-1101's wheel and ribbon couldn't be easier. The printer uses popular IBM Selectric ⅝-inch or equivalent printer ribbon cartridges. As for a print wheel, you can use Juki, Adler, Brother or any other print wheel that will fit properly.

The 1101 has 20 different print options. Activating any of them via control codes from Basic is easy, provided you're careful when converting the control codes listed in the user's manual from hexadecimal to decimal. Some of the more significant features include programmable tab settings, underlining, bold and shadow print and proportional spacing. These are not uncommon features for printers in the same price range, but it's nice to know the DPS-1101 has them.

Accessing the control codes from word-processing software is no problem, either. Word processors that allow you to embed control codes into the text will activate the DPS-1101's print features.

Most commercial software packages permit you to enter only decimal values to activate control codes. The DPS-1101's user's manual, however, lists only hexadecimal values for accessing the printer's unique features. Unless you've memorized the decimal equivalents of hexadecimal numbers up to $FF, you'll need a conversion chart handy as you load control codes into your software.

If you want a letter-quality printer at a reasonable price, the DPS-1101 is a good choice.

Since you can find 1101s on sale at most retailers for about $250 to $300, the printer is a good bargain. It's reliable, easy to use and loaded with convenient features. If you want a good letter-quality printer at a reasonable price, the DPS-1101 is a good choice.

Okidata 120

If Commodore had packed a printer such as its now-defunct 1526 with all the features of the Okidata 120, the chances are that it would have outsold all their other printers combined. The Okidata 120 offers more features and performance per dollar than any other printer, Commodore or third-party, in its price range.

One of the 120's strongest points is its 1525 emulation, which allows it to work well with software that utilizes 1525 print routines. Shortly after my first review of this printer (*RUN*, February 1986), a reader kindly informed me that the 120 is not the perfect 1525 clone—the overall dimensions of pictures created with Doodle (a commercial graphics package) are reduced by about one inch. The reason for the reduced size is that the Okidata has a smaller print size than the 1525.

You can rest assured that the Okidata 120 will reproduce high-resolution bit-mapped screens created on the C-64 and C-128. If duplicating the size of a 1525 printout is important to you, you'll be wise to test the printer with the software you intend to use with it before making your purchase.

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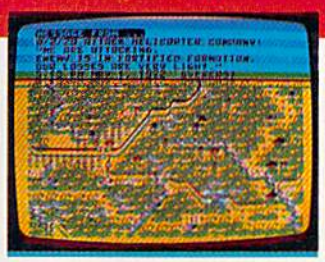

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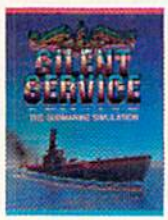

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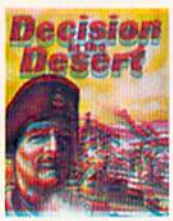

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The Okidata 120 has an appearance and ease of use that makes it a perfect companion for your Commodore computer system. Its sleek profile and compact design also make it appropriate for both home and office. Although it is the same color as the C-128 and its peripherals, it was designed just as much for the C-64. The majority of my testing was performed with a C-64, and the 120 performed as flawlessly with the C-64 as with the C-128.

The 120 performed as flawlessly with the C-64 as with the C-128.

The 120's name reflects its print speed in characters per second in Draft mode. It is capable of printing (and combining) three pica settings, three print modes, super- and subscripts and a host of other features typical of dot-matrix printers in this price range.

When this printer was reviewed in February, it did not contain a near-letter-quality (NLQ) character set. Newer versions—those distributed after March 1986—do. The NLQ characters consist of a 9 × 7 matrix and are selectable via both a front panel button and control codes.

When I first reviewed this printer, my biggest complaint was that the position of the printer's serial cable, on the rear of the unit, can interfere with the flow of paper into the unit. On the other hand, the position of the cable encourages the use of the printer's bottom form-feed feature on the front of the unit.

Okidata's 120

The Okidata 120 is one of the best low-end printers available for Commodore computers. With a price in the $220 to $240 range, you can't go wrong.

Star SG-10C

This serial printer from Star Micronics is a Commodore-dedicated version of the parallel-design Star SG-10, which replaced the popular Gemini 10X. Unlike the SG-10, the SG-10C has a built-in Commodore-dedicated interface and uses a serial cable to connect it with your computer system.

The SG-10C, at 15.2 × 12.4 × 5.7 inches, is a big printer. At 120 cps in Draft mode, it is also fast. Print options include NLQ, emphasized, double-width and reversed print. It also offers an italic character set and downloadable character capability.

It has some dated features, such as a big mechanical tractor-feed unit and a spool ink ribbon. While some low-end printer manufacturers have modernized printer lines with sleek tractor feeds and cartridge ribbons, the SG-10C still has some features that place it a few years behind in technology.

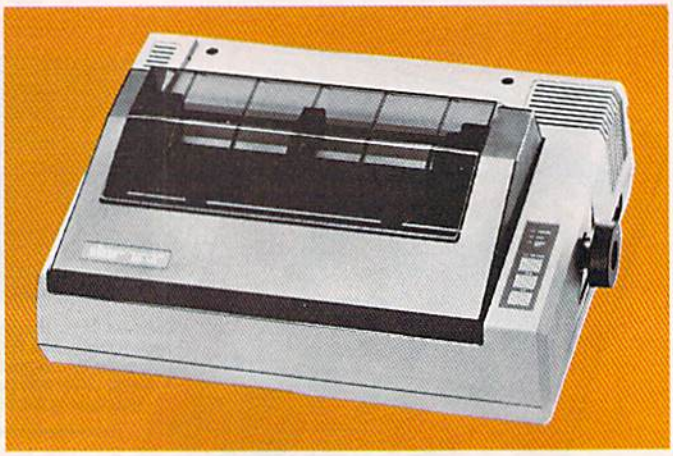
Other distinguishing characteristics of the SG-10C are an NLQ on/off button and light on the control panel and a light-brown plastic body, with a transparent, smoke-colored plastic cover over the platen and print-head area. The color of the printer's body matches that of the C-64 and its family of peripherals, but the SG-10C appears equally harmonious with the C-128.

Although the SG-10C was not originally capable of producing some of the print features you'd expect from a dot-matrix printer in its price range, a free firmware enhancement, called the SG-10 Special Edition, has been available through Star Micronics dealers since last December. This enhancement, consisting of a computer chip and documentation, provides control-code activation of NLQ, italic and double-strike characters.

It also gives you underlining and super- and subscript characters, three features that were previously missing. The enhancement goes a few steps further by providing your SG-10C with control-code-activated line and margin spacing, double-density graphics and a printer reset. All told, the SG-10 Special Edition is a must for all SG-10Cs that lack control-code print features.

Even though the SG-10C doesn't have the high-resolution bit-image reproduction capabilities of the parallel SG-10, it will work with some high-resolution screen dumps written for the 1525. And this brings up another important point. While the SG-10C seems to emulate a 1525 in some operations, you do have to modify some Basic 1525 print routines in order to get them to work with the 10C.

Of course, an inherent weakness of this printer and other Commodore-dedicated printers is that if you change from a Commodore computer system to another brand of computer, you'll have to invest in another printer. A Commodore-dedicated printer, because of its unique serial interface design, is not compatible with any other make of computer.



Star Micronics' SG-10C

Although the SG-10C is a sturdy, well-built unit that's easy to use with any Commodore computer, I am reluctant to recommend it. Though it originally retailed at a high $339, most computer stores now offer it for around $230 and up. But even at a cost under $250, the SG-10C seems overpriced because of its limitations.

Star SG-10 and SG-15

I don't hesitate to recommend the parallel SG-10, which is much more versatile than the SG-10C. As mentioned above, the SG-10 is the base printer from which the SG-10C originated. The SG-15, which has a 15-inch carriage and built-in 16K print buffer, is simply a larger version of the SG-10.

Introduced early in 1985, the SG-10 and 15 printers are the replacements for the popular Star Gemini 10X and 15X parallel printers. Both the 10 and 15 share some of the SG-10C's features, such as a big, removable tractor mechanism and a spool ink ribbon. The SG-10 possesses all of the 10C's useful features, such as the italic character set, the NLQ mode and 120 cps printing in Draft mode, but both the 10 and 15 offer more substantial and useful print features than the SG-10C.

Superscript and subscript characters are standard on both the SG-10 and SG-15.

The most important difference between the SG-10C and these two printers is that control codes, instead of dip switches, can be used with the SG-10 and SG-15 to activate some of the print features. You can isolate specific areas of text in word processors and other software to print underlined, italic and downloadable custom characters in your documents. Superscript and subscript characters, not available on the 10C, are standard on both the SG-10 and SG-15.

Both of them also have high-resolution, dot-addressable graphics capability, with seven density settings; and, instead of the SG-10C's two print pitches, controlled only by a dip switch, the 10 and 15 offer four print pitches accessed by control codes.

The advantages that these two parallel printers have over the SG-10C are obvious. On the other hand, the SG-10C has one clear advantage over the other two. With the SG-10C, you won't have to buy the parallel interface that's necessary in order to use the other two printers with your computer. Yet the interface is a small price to pay in view of the added versatility you get with the parallel printers.

A number of computer peripheral retailers have been offering the SG-10 for around $210 and the SG-15 for about $375. At these prices, they are both excellent bargains for the features they offer.

Next month, Part II of this article will bring you even more information on other major dot-matrix and letter-quality printers. R

Address all author correspondence to Tim Walsh, Technical Editor, RUN *Magazine, 80 Pine St., Peterborough, NH 03458.*

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Your Guide to Printer

	Super Graphix	MW-350	G-Wiz	Card?B	Uniprint	Printmaster /+G	PPI With Graphics Buffer
Manufacturer	Xetec	Micro R&D	Cardco	Cardco	Giga Int'l	Omnitronix	Data Share
Price	$99.95	$129	$69.95	$59.95	$69.95	$99.95	$49.95
Type:							
Graphics	✓	✓	✓		✓	✓	✓
matrix width	6/8	6/8	6/8	n/a	6	6	6
Text	✓	✓	✓	✓		✓	✓
Buffer Size	8K	4K	20 bytes**			16K ($89.95)	25 bytes
Reset Button	✓	✓				✓	
Printer Categories	8	5	6	ASCII	2	5	1
Operating Modes:							
Emulation of 1525	✓	✓			✓	✓	✓
Modified emulation	✓	✓	✓	✓		✓	✓
ASCII conversion	✓	✓		✓		✓	✓
Monitor:							
hexadecimal	✓		✓				
decimal		✓				✓	
Basic Listing Modes:							
Full graphics	✓	✓			✓	✓	✓
Mnemonics	✓	✓	✓	✓		✓	
Keystrokes	✓	✓					
ASCII values:							
hexadecimal	✓						
decimal			✓	✓		✓	
Setting Switches:	8	8	8	3		8	
Transparent	✓	✓	✓	✓			
Monitor mode			✓				
Linefeed		✓	✓	✓		✓	
ASCII conversion		✓				✓	
Device number	✓	✓	✓	✓		✓	
Printers	3	3	4			3	
Fonts	2						
Single/double density						✓	
Graphics reverse						✓	
Transparent Mode:							
Hardware	✓	✓	✓	✓			
Software	✓	✓	✓	✓		✓	✓
Soft lock	✓	✓	✓	✓		✓	✓
Linefeed Selection:							
Hardware		✓	✓	✓		✓	
Software	✓	✓	✓	✓	✓	✓	✓
Soft lock	✓	✓	✓	✓			✓
Interface Control:							
Secondary addresses	15	5	9	6	8	15	13
Secondary-address lock	✓	✓	✓	✓		✓	✓
Escape codes	24*	7				2	
Command channel	23					✓	
Special Features:							
Fonts:	3						
NLQ	built-in						✓
User	2						
Redefinable							✓
Built-in utilities							✓
Screen dumps:							
C-64:							
bit map	✓						
character	✓						
VIC-20:							
character	✓						

Footnotes

*—These escape codes control the printing of the built-in near-letter-quality (NLQ) mode and the downloadable fonts. Typical features include sub- and superscripts, expanded, compressed, emphasized and bold print, and underlining. This allows most standard printer features to be implemented with the interface-generated fonts. The Super Graphix Jr. supports only underlining with its NLQ font.

**—This buffer is a part of the interface's microprocessor. A separate RAM buffer is not built-in. These interfaces utilize the small buffer size to minimize head shuttle as much as possible.

***—The lock function on the Turboprint GC is only for the transparent modes.

Interfaces

By MORTON KEVELSON

Turboprint GC	The Connection	Super Graphix Jr.
Telesys	Tymac Control	Xetec
$59.95	$69.95/$73.95	$59.95
✓	✓	✓
6/8	6/8	6/8
✓	✓	✓
	2K	112 bytes**
	✓	
8	1****	8
✓	*****	✓
✓	✓	✓
		✓
		✓
	✓	
✓	✓	✓
✓		✓
✓		✓
		✓
	✓	
4	2	8
	✓	✓
	✓	✓
✓	✓	✓
3	1****	3
		1
	✓	✓
✓	✓	✓
✓	✓	✓
✓	✓	✓
***	✓	✓
	✓	✓
	✓	✓
20	9	8
***	✓	✓
	11	2*
		14
		1
		built-in

****—The interface must be ordered with a printer-specific ROM.

*****—This interface does not print reverse text. Reverse-text characters are printed as underlined regular characters.

Compatibility and price are only two considerations in choosing an interface. This handy chart shows you the printer features that various interfaces support.

Notes on the Chart.

The Type category identifies the interface as either a graphics or text device. Only a graphics interface will provide total emulation of the Commodore 1525 printer.

Matrix width refers to the number of printer bits the interface uses to generate the Commodore graphics characters. This should match the number of bits in the width of the printer's text characters.

The built-in RAM buffer serves two functions. A large buffer can store a quantity of text while waiting for the printer to accept additional data. This can speed operations by freeing up the computer much sooner. This advantage is greatest with slow, letter-quality printers.

The second advantage of a buffer is that it helps minimize the head shuttling with some graphics printers when they're emulating the Commodore graphics modes. This is most noticeable with printers that are unidirectional when printing bit graphics. (Epson and Epson clones fall into this category.) For maximum effectiveness in this application, a buffer size of at least one-half K is required.

The operating modes and the Basic listing modes show the various degrees of emulation possible with the interfaces. This indicates the readability of Basic program listings. Most of the interfaces print the ASCII codes of otherwise unlistable characters. The chart indicates if these values are in hexadecimal or decimal.

The monitor modes are handy debugging aids for printer routines.

The chart indicates the total number of setting switches and also the number of these switches that are dedicated to printer selection. Although three switches offer eight possible combinations, most interfaces do not take full advantage of this variety. The various hardware settings are important for applications that do not allow software selection of the interface's operating mode (e.g., cartridges that take control of the computer on power up). R

Address all author correspondence to Morton Kevelson, PO Box 260, Homecrest Station, Brooklyn, NY 11229.

List of Manufacturers

Cardco
300 S. Topeka
Wichita, KS 67202
316-267-6525

Xetec
3010 Arnold Road
Salina, KS 67401
913-827-0685

Data Share
717 South Emporia
Wichita, KS 67211
316-264-6118

Telesys
43334 Bryant St.
Fremont, CA 94539
415-651-2970

Micro R & D
3333 S. Wadsworth Blvd., #A104
Lakewood, CO 80227
303-985-4077

GIGA International Corp.
605 Broad Ave.
Ridgefield, NJ 07657
201-941-1800

Omnitronix
PO Box 43
Mercer Island, WA 98040
206-236-2983

Tymac Control Corp.
127 Main St.
Franklin, NJ 07416
201-827-4050

C-128 Ultra Hi-Res

By DAVID DARUS, KEN FRENCH and LOUIS WALLACE

Increase the flexibility of your existing C128 Ultra Hi-Res program with this set of powerful and swift graphics commands.

In *RUN*'s February 1986 issue, we announced that the C-128 was fully capable of using its 80-column RGB mode for ultra high-resolution (640 × 200 pixels) graphics. We also introduced you to the C-128 Ultra Hi-Res graphics language. This month, we will expand on that topic with several new additions to the command set.

The C-128 Ultra Hi-Res is a language that wedges itself into memory so that its commands are executed along with those of the normal Basic 7.0. Without slowing down normal Basic, it accomplishes this by intercepting the Syntax Error subroutine that issues error messages when you make a typing mistake.

All Ultra Hi-Res commands are preceded by the @ symbol, which is not used by Basic. When the C-128 Basic interpreter encounters this in the context of a command, it passes control to the Syntax Error subroutine, which would normally display a syntax error message and stop the program.

However, we have changed the vector that points to that subroutine. Instead, it points to a machine language subroutine that checks to see if the error is truly an error, or one of our new commands. If the latter, control is passed to the appropriate Ultra Hi-Res module; if not, it jumps to the normal Syntax Error subroutine.

The advantage of this wedge over others is that it allows Basic to run at top speed and checks for our routines only when they are encountered. If you combine this with the Fast command, which operates at 2 MHz, you'll have your C-128 running at full throttle with many new and powerful graphics commands.

To use Ultra Hi-Res, part 2, you'll need a copy of part 1. (See "Ultra Hi-Res Graphics," *RUN*, February 1986.) You will then combine all the commands to form an enhanced version (Ultra Hi-Res Version 1.1).

The Ultra Hi-Res 1.1 Programs

Three programs accompany this article. Carefully type them in and, before running them, save them to a disk containing both the old machine language version of the Ultra Hi-Res program and its Boot program.

First, load the program called UH.DATA (Listing 1) and run it in normal C-128 80-column mode, not in Ultra Hi-Res mode. It will create a number of binary files on the disk.

After running Listing 1, load and run the program called MAKEUH V1.1 (Listing 2). This program will first load into memory the old version of Ultra Hi-Res, then it will add the new modules. It will also rename the original version to Ultra Hi-Res.old and save a new version called Ultra Hi-Res. Ultra Hi-Res 1.1 is now ready for use. To activate it, load and run the Ultra Hi-Res Boot program, as you used it to load the original Ultra Hi-Res program.

The final program is called UH.PIC CONVERT (Listing 3). We've changed the original picture-file format to allow upward compatibility of Ultra Hi-Res pictures in future applications programs. Listing 3 allows you to change pictures made with version 1.0 to this new format. Place in the drive a disk that contains the pictures you want converted and answer the prompts. Your old Ultra Hi-Res pictures will now be fully compatible with Ultra Hi-Res 1.1.

Finally, to legally use this program to create applications you wish to give away, you must use the fifth new command,

RUN It Right

C-128 (in C-128 mode)

Graphics, Part 2

@WALRUS, which creates a logo crediting the program's authors. It is your legal obligation to display this logo for any non-personal use. (If you intend to sell your applications, please contact the authors about licensing.)

The Commands

Part 2 adds five new commands that give professional-level graphics power to the already-powerful Ultra Hi-Res command set. Combined with the C-128's large memory and 2 MHz clock speed, you will be able to use Basic to write very impressive applications programs.

The first new command—@CIRCLE—is also found in normal 40-column Composite mode and functions in the same way; however, with Ultra Hi-Res 1.1, you can only have two colors on screen at once, rather than the 16 available in 40-column mode. To compensate for this loss of color, you can change your drawing mode from Draw to Erase. The syntax is:

@CIRCLE,mode,cx,cy,xr,yr<,sa,ea,angle,increment>

Mode is 0 for erase and 1 for draw; cx is the x coordinate of the center (0–639); cy is the y coordinate of the center (0–199); xr is the x radius (1–319); yr is the y radius (1–100). The parameters within the brackets, < >, are optional. The sa is the starting angle (0–360); ea is the ending angle (0–360). These allow you to draw arcs easily. The angle is the number of degrees (0–360) you wish to rotate the circle, ellipse or arc. The increment is the number of degrees used in drawing the circle. By changing the increment, you can use the Circle command to draw polygons.

The defaults for the optional parameters are: sa = 0; ea = 360; angle = 0; and increment = 8. For more information on the circle parameters, see the C-128's system guide.

The second new command is called @PAINT. Unlike the 40-column Paint command, this one only provides one color at a time. This could be a problem when it comes to graphics and charts. The @Paint command compensates for this paucity of colors by allowing you to fill areas with varieties of different patterns. The syntax of the command is:

@PAINT,x,y,mode<,p1><,p2>
<,p3,p4><,p5,p6,p7,p8>

Here x is any value from 0–639; y is any value from 0–199; and mode is 0 (for erase) and 1 (for draw). The p values are numbers from 0–255 and represent the decimal values of the binary patterns used in the fill. For example, if you wanted to generate an interesting patchwork pattern to fill an area, you would use the following values.

01100110	102
11001100	204
00110011	51
10000001	129
10011001	153
01111110	126
00000000	0
10101010	170

The command format is:

@PAINT,x,y,1,102,204,51,129,153,126,0,170

This will fill a specified area with that pattern. If you do not enter any specified values, the area will be filled with a

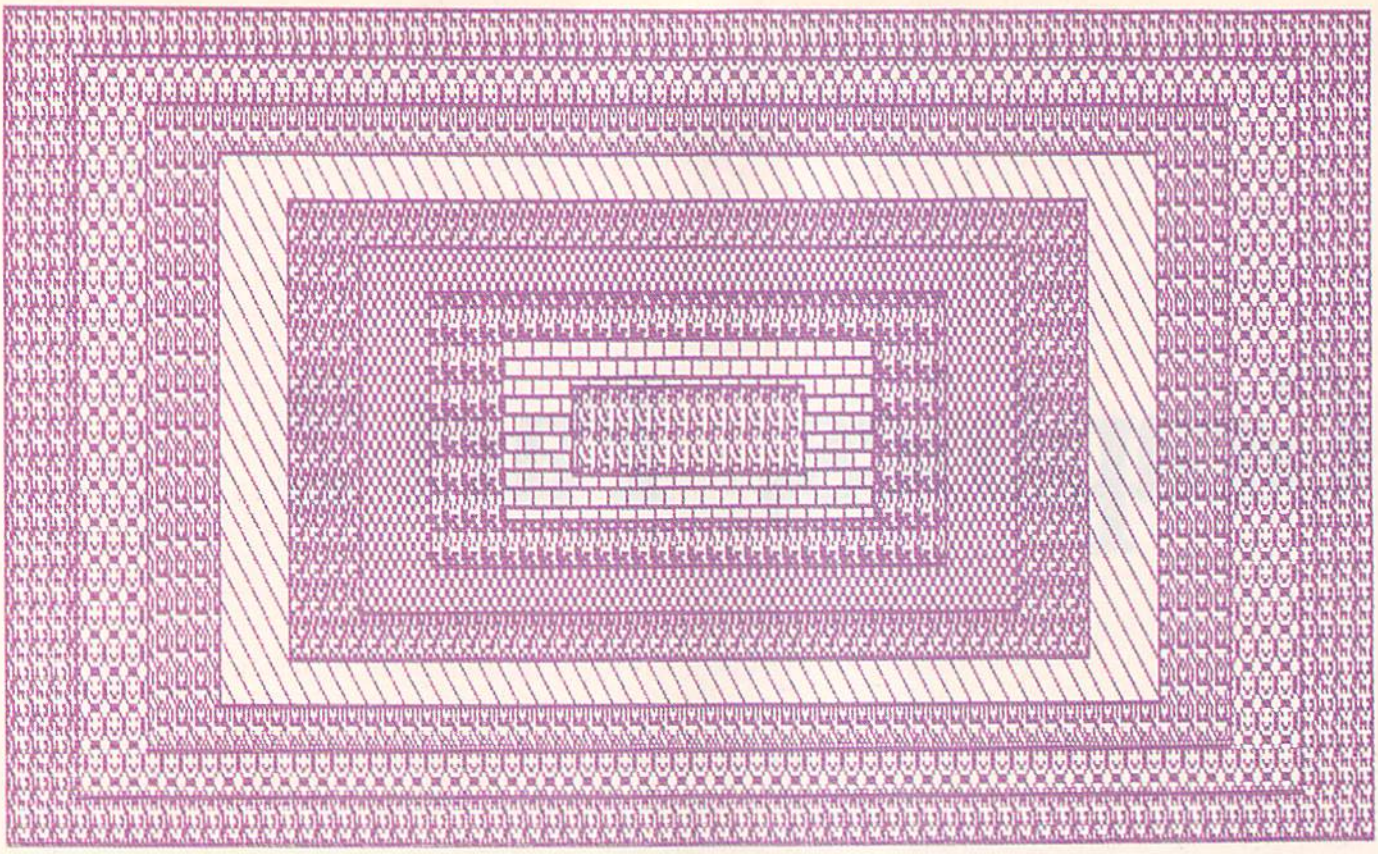

Photo 1. This is a sample of pattern paint. Some patterns were planned, others are simply random. You can use any 8×8 pixel pattern.

solid pattern. By entering only one number, its pattern is repeated eight times; if you enter two numbers, the pattern of the pair is repeated four times; if you enter four numbers, each pattern is repeated once.

You can clear a solid area (not a pattern) by using a mode of 0. You must make sure the area to be filled is completely enclosed or the pattern will leak out and fill the screen.

The third command is @HCOPY. This will dump the graphics screen to a printer in any of four different sizes. The syntax is:

@HCOPY,size, secondary address

The size is from 1–4, and the secondary address is whatever your printer interface requires for Graphics mode with no linefeeds. For example, the Cardco B and PPI with Graphics interfaces require a secondary address of 5. At the moment, only the Epson, Mannesmann Tally Spirit 80 and Olivetti PR2300 printers are supported, but additional modules will be added if the demand is there.

The fourth command is @DRWMOD. This sets up a special form of the Draw mode that performs an XOR on the screen when you use any of the drawing commands (Dot, Line, Box, Circle or Bar). It reverses lines on the screen. This command allows you to create the illusion of transparency when two points overlap. The syntax is:

@DRWMOD,mode

The mode is 0 or 1, with 0 indicating no complement and 1 indicating complement.

A Gem of a Program

You don't often find a graphics utility that enhances the usefulness of a computer for personal and professional applications. Ultra Hi-Res is a rarity that greatly extends the already-powerful features of the C-128. You will most likely discover many ways to use this new graphics power.

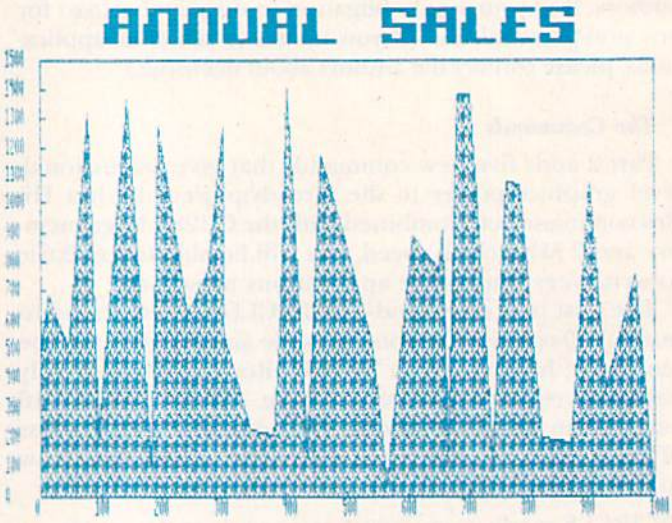

Photo 2. Screen display of a business chart.

Look forward to more articles on the inner workings of the 8563 video chip. Ultra Hi-Res is only one aspect of what this chip is capable of accomplishing. R

Address all author correspondence to Louis Wallace, 6124B SW 11th Place, Gainesville, FL 32607 or David Darus, 2508 NW 65th Terrace, Gainesville, FL 32606.

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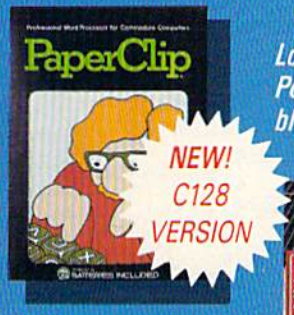

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Listing 1. *UH.DATA program.*

```
1ØØ GRAPHIC1,1:GRAPHIC5:FAST          :REM*32
2ØØ PRINT"{SHFT CLR}{CRSR DN}MAKING PROGRAM
    FILES..."                          :REM*4
1ØØØ FORZ=1536ØTO15574:READY:POKEZ,Y:NEXT
                                       :REM*2Ø9
1ØØ1 DATA32,128,3,2Ø1,254,2Ø8,27,32 :REM*24
1ØØ2 DATA128,3,234,234,234,234,234,234
                                       :REM*27
1ØØ3 DATA234,234,234,234,234,234,234,234
                                       :REM*68
1ØØ4 DATA234,234,234,234,234,234,234,76
                                       :REM*97
1ØØ5 DATA2Ø1,33,2Ø1,226,2Ø8,3,76,8Ø :REM*84
1ØØ6 DATA55,2Ø1,68,2Ø8,3,76,82,6Ø  :REM*225
1ØØ7 DATA2Ø1,8Ø,2Ø8,3,76,1Ø3,6Ø,234 :REM*64
1ØØ8 DATA234,234,234,234,234,234,234,234
                                       :REM*73
1ØØ9 DATA234,234,234,234,234,234,234,234
                                       :REM*74
1Ø1Ø DATA234,234,234,234,76,248,33,76
                                       :REM*245
1Ø11 DATA67,33,162,4,32,128,3,221    :REM*34
1Ø12 DATA98,6Ø,2Ø8,243,2Ø2,16,245,76
                                       :REM*185
1Ø13 DATA123,6Ø,68,79,77,87,82,162 :REM*162
1Ø14 DATA3,32,128,3,221,119,6Ø,2Ø8  :REM*77
1Ø15 DATA222,2Ø2,16,245,76,144,6Ø,76
                                       :REM*168
1Ø16 DATA69,88,73,32,128,3,32,9     :REM*213
1Ø17 DATA136,138,2Ø8,6,169,13,141,159
                                       :REM*14
1Ø18 DATA36,96,169,77,141,159,36,96 :REM*17
1Ø19 DATA32,128,3,32,15,136,165,22 :REM*184
1Ø2Ø DATA141,35,55,165,23,141,36,55:REM*2Ø3
1Ø21 DATA32,9,136,142,34,55,173,Ø   :REM*2ØØ
1Ø22 DATA255,41,254,141,Ø,255,169,1:REM*191
1Ø23 DATA141,37,55,32,1Ø8,54,144,4 :REM*194
1Ø24 DATA169,1,2Ø8,2,169,Ø,133,25Ø :REM*152
1Ø25 DATA169,Ø,133,251,96,32,128,3   :REM*17
1Ø26 DATA162,Ø,32,224,34,169,33,141:REM*196
1Ø27 DATA235,49,32,122,34,96,Ø      :REM*1Ø3
1Ø3Ø BSAVE"P.ULTRA.K",BØ,P1536Ø TO P15574
                                       :REM*184
2ØØØ FORZ=9Ø35TO9529:READY:POKEZ,Y:NEXT
                                       :REM*17
2ØØ1 DATA173,Ø,255,41,254,141,Ø,255 :REM*62
2ØØ2 DATA173,196,49,133,252,173,197,49
                                       :REM*53
2ØØ3 DATA133,253,173,198,49,133,254,32
                                       :REM*48
2ØØ4 DATA191,48,165,252,41,7,17Ø,189 :REM*7
2ØØ5 DATA72,37,141,223,49,56,173,2ØØ:REM*78
2ØØ6 DATA49,237,196,49,141,2Ø4,49,173
                                       :REM*53
2ØØ7 DATA2Ø1,49,237,197,49,141,2Ø5,49
                                       :REM*236
2ØØ8 DATA56,173,2Ø2,49,237,198,49,141
                                       :REM*187
2ØØ9 DATA2Ø6,49,173,2Ø3,49,237,199,49
                                       :REM*7Ø
2Ø1Ø DATA141,2Ø7,49,173,2ØØ,49,141,196
                                       :REM*63
2Ø11 DATA49,173,2Ø1,49,141,197,49,173:REM*8
2Ø12 DATA2Ø2,49,141,198,49,173,2Ø3,49
                                       :REM*1Ø3
2Ø13 DATA141,199,49,169,Ø,141,217,49
                                       :REM*248
2Ø14 DATA44,2Ø5,49,16,23,173,2Ø4,49  :REM*7
2Ø15 DATA32,2Ø7,36,141,2Ø4,49,173,2Ø5
                                       :REM*92
2Ø16 DATA49,32,2Ø8,36,141,2Ø5,49,169:REM*47
2Ø17 DATA2,141,217,49,44,2Ø7,49,16 :REM*198
```

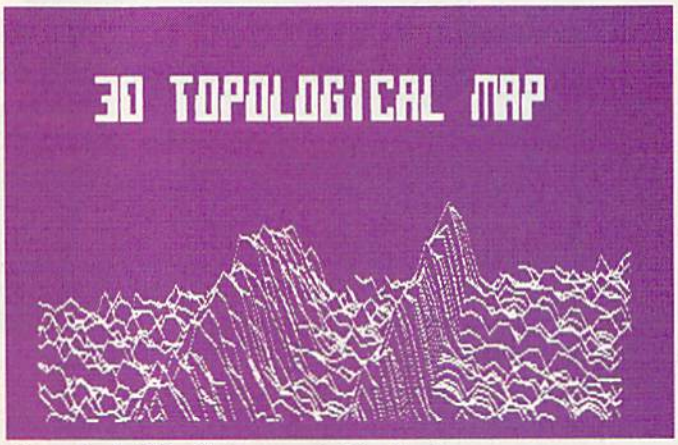

Photo 3. A 3-D effect generated by the program.

```
2Ø18 DATA27,173,2Ø6,49,32,2Ø7,36,141
                                       :REM*227
2Ø19 DATA2Ø6,49,173,2Ø7,49,32,2Ø8,36
                                       :REM*17Ø
2Ø2Ø DATA141,2Ø7,49,24,173,217,49,1Ø5
                                       :REM*249
2Ø21 DATA4,141,217,49,174,2Ø4,49,236
                                       :REM*23Ø
2Ø22 DATA2Ø6,49,173,2Ø5,49,168,237,2Ø7
                                       :REM*1Ø7
2Ø23 DATA49,16,27,173,2Ø6,49,141,2Ø4 :REM*8
2Ø24 DATA49,173,2Ø7,49,141,2Ø5,49,142
                                       :REM*177
2Ø25 DATA2Ø6,49,14Ø,2Ø7,49,24,173,217
                                       :REM*226
2Ø26 DATA49,1Ø5,8,141,217,49,173,2Ø4:REM*55
2Ø27 DATA49,32,2Ø7,36,141,214,49,173:REM*96
2Ø28 DATA2Ø5,49,32,2Ø8,36,141,215,49
                                       :REM*129
2Ø29 DATA56,48,1,24,11Ø,215,49,11Ø :REM*112
2Ø3Ø DATA214,49,16Ø,Ø,14Ø,212,49,14Ø
                                       :REM*219
2Ø31 DATA213,49,24Ø,55,174,217,49,24:REM*36
2Ø32 DATA173,214,49,1Ø9,2Ø6,49,141,214
                                       :REM*191
2Ø33 DATA49,173,215,49,1Ø9,2Ø7,49,141
                                       :REM*148
2Ø34 DATA215,49,48,2Ø,56,173,214,49 :REM*35
2Ø35 DATA237,2Ø4,49,141,214,49,173,215
                                       :REM*134
2Ø36 DATA49,237,2Ø5,49,141,215,49,232
                                        :REM*15
2Ø37 DATA32,192,36,238,212,49,2Ø8,3:REM*2ØØ
2Ø38 DATA238,213,49,142,216,49,173,7
                                       :REM*133
2Ø39 DATA5Ø,24Ø,2,169,128,141,224,49
                                       :REM*222
2Ø4Ø DATA32,183,36,32,161,48,141,221:REM*99
2Ø41 DATA49,32,183,36,173,223,49,44:REM*218
2Ø42 DATA224,49,48,8,73,255,45,221 :REM*1Ø5
2Ø43 DATA49,76,162,36,13,221,49,32 :REM*18Ø
2Ø44 DATA172,48,174,216,49,173,212,49
                                       :REM*1Ø7
2Ø45 DATA2Ø5,2Ø4,49,173,213,49,237,2Ø5
                                       :REM*1Ø2
2Ø46 DATA49,144,137,96,162,18,165,251
                                       :REM*113
2Ø47 DATA164,25Ø,76,145,48,189,25,37
                                       :REM*144
2Ø48 DATA141,2Ø5,36,189,41,37,141,2Ø6
                                       :REM*214
```

Continued on p. 92.

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A small section of the wilderness your band must explore.

PIPPACOTT (1)
1 SWAT HUMAN RANGER OKAY
2 RUFF DWARF PRIEST OKAY
3 LORD DULL ELF WIZARD OKAY
4 SYLVIA HALFLIN THIEF OKAY
5 HAM OF RYE GNOME MONK OKAY
6 SKULLCRUSHER MINOTAU FIGHTER OKAY
-- ADVENTURERS GUILD --
PARTY MEMBERS: S)PELLS T)RAINING D)ROP FROM PARTY
GUILD MEMBERS: L)IST P)URGE N)EW MEMBER R)ENAME A)DD TO PARTY
E)XIT GUILD
COMMAND:

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Swish!

Outshoot your opponent on home court with this popular one-on-one basketball game, Horse.

By MARK JORDAN

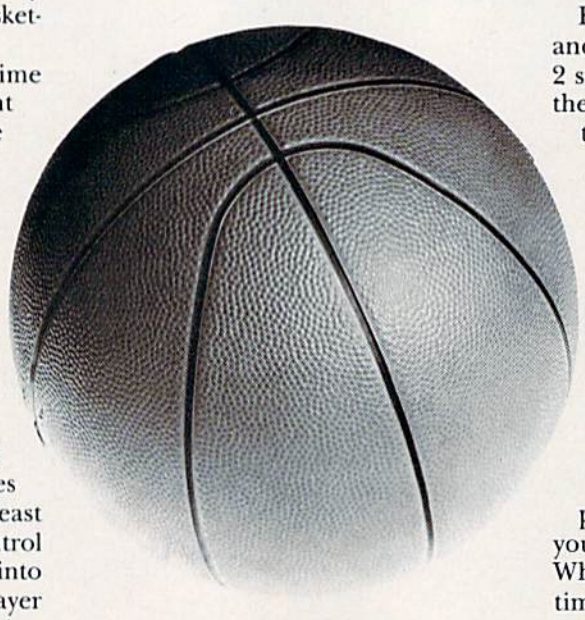
If the title of this program conjures up images of braying, sweating, racetrack animals, then it's obvious you're not from Indiana. Everybody here knows that Horse is a backyard basketball game. And it's fun because only one (and everybody's favorite) basketball skill is required—shooting.

The rules are simple: Each time you make a basket, your opponent must duplicate the shot. If he misses, he gets a letter from the word *horse*. If he succeeds, neither one of you receives a letter, and you simply continue making your shots. Once you miss, though, your opponent gets a free shot and a chance to turn the tables. The first player to spell out *horse* loses.

The computerized version of this game follows the same format as the backyard game. It requires two joysticks, two players and at least one good shooting eye. You control player 1 with a joystick plugged into port 2; your opponent controls player 2 with a joystick plugged into port 1.

You begin the game by moving your player anywhere on the court to shoot. You press the fire-button to position the ball for the shot, then press the button again, this time holding it down to control the ball's arc. When you feel the ball has achieved just the right height to begin its descent, you release the button.

The ball completes its upward climb with a neat loop and begins to fall. It nears the basket and, *swish*, falls through. A bell rings, and the word *good* appears beneath the scoreboard. The ball continues falling until it hits the floor, where it begins bouncing.



Now your opponent, player 2, hustles over to retrieve the ball and starts dribbling like mad. He quickly moves to the spot from which you made your shot. He must position himself within 16 pixels of your x,y shooting coordinates, or the shot won't go, and he will get a letter.

So, player 2 places himself where he thinks you were just positioned (you were smart; you moved away from your shooting location), and presses his fire-button. His sprite switches from dribbling to the ready-to-shoot position. He again presses and holds the fire-button, and the ball arcs gracefully to the basket. He releases. The ball descends.

Boing! It strikes the back of the rim and bounces high into the air. Player 2 sucks in his breath and watches as the ball comes down—*and through!*—the hoop. No H this time.

The game continues as player 1 grabs the ball and moves to a new location to shoot again. As long as he keeps making his "free" shots, he cannot lose. Once he misses, though, player 2 gets the free shot, and the tables are turned.

Do It with Style

Those are the basics; here are the embellishments. First, in computerized Horse, you'll find that you can change your shooting style. When you press the button the first time, you'll not only discover that you've maneuvered your man into the shooting posture, but that moving the joystick will no longer affect his screen position; he is frozen to that spot until the shot is completed.

Now, by pushing upward on the stick while pressing the button to start the shot, the ball will rise on a much steeper path than before. This high-arc shot is especially good for close-in shots, such as lay-ups. Note that you can release the stick after you have pressed the button. The

RUN It Right

C-64; C-128 (in C-64 mode); two joysticks

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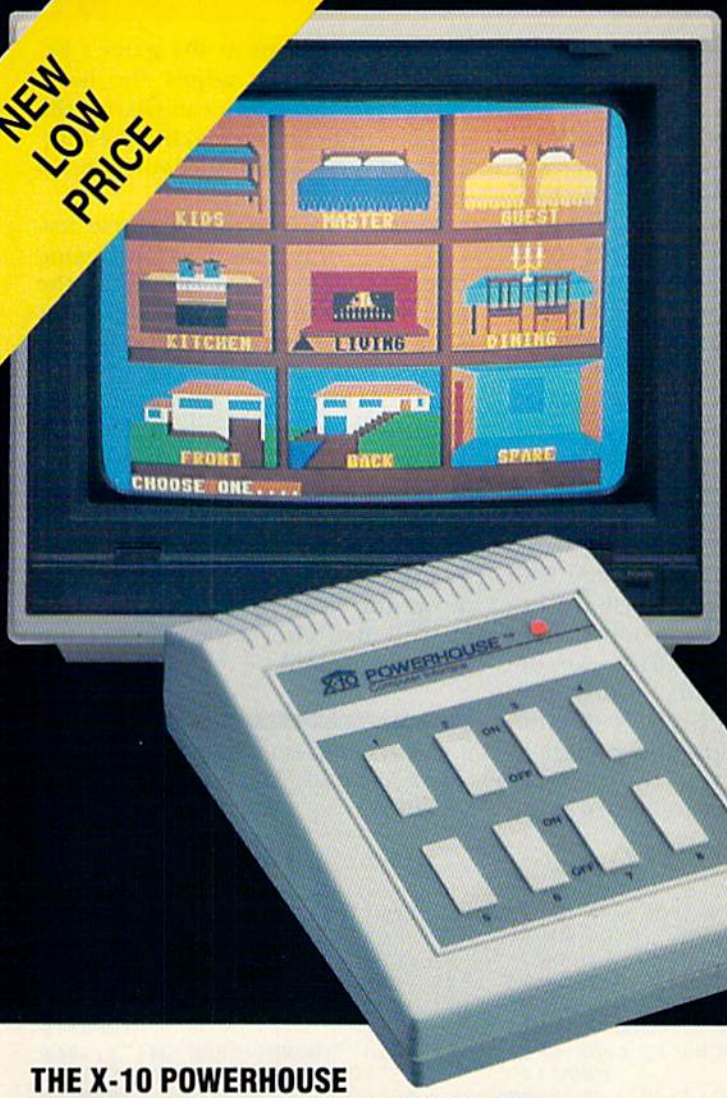

Model CP290

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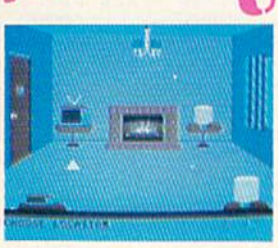

THE WAY IT WORKS. The X-10 Powerhouse Interface is cable-connected to the Commodore "User" port and plugged into a standard 110V outlet. After it is programmed, the Interface sends digitally encoded signals through your home wiring to special X-10 Modules. To control a lamp or appliance, you simply plug the electrical device into a Module and then plug the Module into an outlet. The Interface can control up to 256 Modules throughout your home and won't interfere with normal use of lights and appliances.

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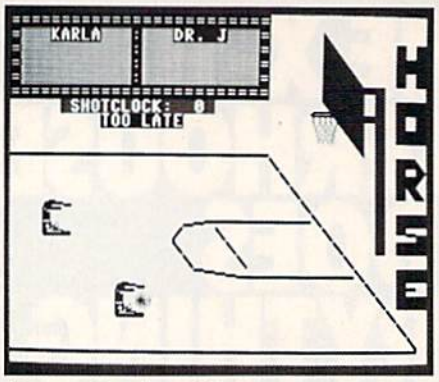


Screen shot from Horse program.

high arc is selected at the instant you press the button and will remain that way throughout the shot.

If you'd like a low-arc shot, just point the joystick downward while pressing the fire-button for the second time.

The advantage of choosing a high- or low-arc shot is that, if you make the shot, your opponent will be forced to shoot the same arc. In fact, it won't matter if he pushes the joystick or not—the arc will mimic yours automatically.

The high-arc shot can be tricky because it sometimes arcs above the viewing range of the screen. You have to depend on your sense of timing to choose the exact moment to release the button. The low-arc shot is difficult because, just as in the real game of basketball, its sharp angle requires a finer shooting touch. Not only that, but low-arc shots are very difficult to bank in.

Did I mention bank shots? Yes, you can bank the ball off the backboard. If you choose the bankshot option at the opening of the game, all bankshots made must be duplicated with a bankshot, or the non-banking shooter will get another letter, whether or not he makes his shot. However, until you become familiar with Horse, I recommend you press N (for no) whenever the bankshot option is displayed.

Besides bankshots, you are given two other options at the game's beginning: You can adjust the ball's flight speed, and you can change the level of difficulty in making the shot. Both of these options let you control the difficulty of play.

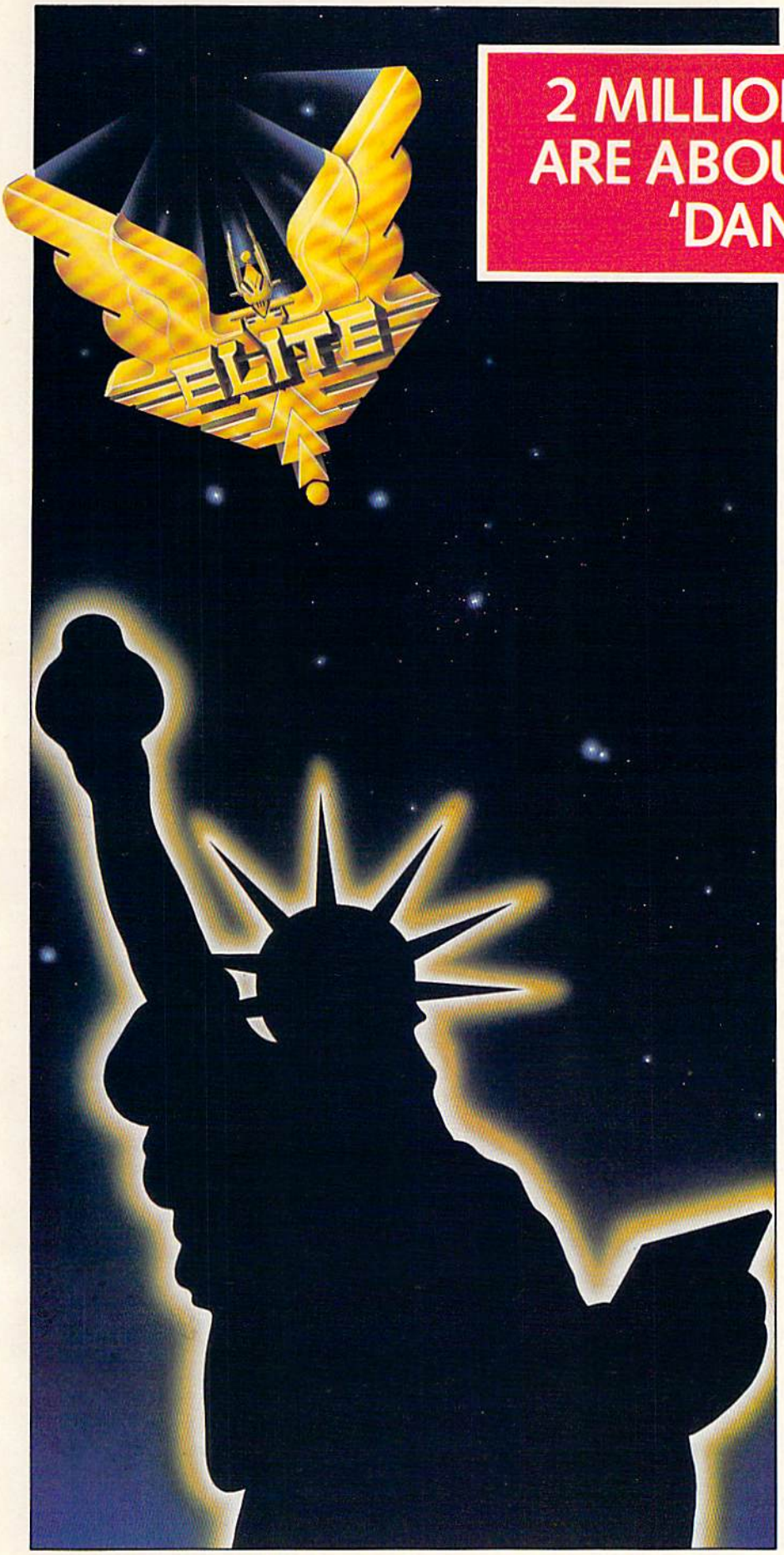
Finally, this version of Horse features something the backyard game doesn't have—a shot clock. When the ball hits the floor from the previous shot, you have exactly seven seconds to get your shot off. The clock is visible. The reason for having this feature is to put a little hustle into the game. It forces you to grab the rebound and move quickly into your opponent's old position. You can change the length of time by changing the value of CT in line 260 of the program.

Well, that's it. I hope you have fun horsing around. R

Address all author correspondence to Mark Jordan, 70284 C.R. 143, Ligonier, IN 46767.

Listing 1. *Horse program.*

```
10 POKE53281,13:POKE5328Ø,5
                              :REM*86
15 FORT=ØTO8:READH(T),L(T),D(T):
   NEXT                       :REM*133
2Ø IFPEEK(12288)=7THEN4Ø      :REM*22
25 PRINT"{SHFT CLR}{COMD 4}PLEAS
   E WAIT 11 SECONDS"         :REM*19
3Ø FORT=ØTO319:READA:POKE12288+T
   ,A:NEXT                    :REM*182
35 FORT=49152TO5Ø155:READA:POKET
   ,A:NEXT                    :REM*93
4Ø V=53248:POKEV+21,17        :REM*38
45 FORT=ØTO4:POKE2Ø4Ø+T,192+T:NE
   XT                         :REM*37
5Ø POKEV,35:POKEV+1,174:POKEV+39
   ,6                         :REM*188
55 POKEV+2,5Ø:POKEV+3,155:POKEV+
   4Ø,4:POKE2Ø41,192          :REM*119
6Ø POKEV+6,255:POKEV+7,1Ø2:POKEV
   +42,8                      :REM*1ØØ
65 POKEV+8,65:POKEV+9,179:POKEV+
   43,9                       :REM*171
7Ø SYS49158                   :REM*134
75 POKE7Ø8,1:S=54272:FORT=STOS+2
   4:POKET,Ø:NEXT             :REM*169
8Ø POKES+12,Ø:POKES+13,24Ø:POKES
   +24,15                     :REM*214
85 GOSUB47Ø                   :REM*167
9Ø INPUT"{SHFT CLR}{CRSR DN}{CTR
   L 7}{CTRL 9} PLAYER 1{CTRL Ø}
    (PORT 2)";P$(Ø):PØ=(11-LEN(P
   $(Ø)))/2                   :REM*142
95 POKEV+39,4                 :REM*23
1ØØ INPUT"{CTRL 5}{CTRL 9} PLAYE
   R 2{CTRL Ø} (PORT 1)";P$(1):
   P1=(11-LEN(P$(1)))/2:REM*24Ø
1Ø5 INPUT"{CTRL 9}{COMD 5} WHAT
   LEVEL (EASY Ø - 9 HARD) {CTR
   L Ø} 5{3 CRSR LFs}";LV:POKE6
   93,242+LV                  :REM*47
11Ø INPUT"{CTRL 9} BALL SPEED (F
   AST Ø - 9 SLOW){CTRL Ø}{2 SP
   ACEs}5{3 CRSR LFs}";BL:KL=BL
   +3:BL=BL+1                 :REM*23Ø
115 INPUT"{CTRL 9}{COMD 7} MATCH
    BANKSHOTS (Y/N) {CTRL Ø} N{
   3 CRSR LFs}";BS$           :REM*25
12Ø POKE7Ø8,Ø:POKEV+39,6      :REM*94
125 TM$="{HOME}{6 CRSR DNs}{5 CR
   SR RTs}{CTRL 9}{COMD 7} SHOT
   CLOCK:{4 SPACEs}{3 CRSR LFs}
   "                          :REM*141
13Ø M$=LEFT$(TM$,12)+"{3 CRSR RT
   s}{CTRL 1}{CRSR DN} {CTRL 9}
   "                          :REM*38
135 SP$="{HOME}":HL$="{CRSR RT}H
   {CRSR RT}O{CRSR RT}R{CRSR RT
   }S{CRSR RT}E":PL$="{COMD 7}{
   CTRL 9}{1Ø SPACEs}"        :REM*249
14Ø FORT=1TO4Ø:CL$=CL$+"{CRSR RT
   }":SP$=SP$+"{CRSR DN}":NEXT
                              :REM*94
145 P3$="{HOME}{CRSR DN}"+CL$
                              :REM*121
15Ø P$(Ø)="{CTRL 7}"+LEFT$(P3$,P
   Ø+3)+P$(Ø)                 :REM*224
155 PH$(Ø)="{CTRL 7}{HOME}{3 CRS
   R DNs}{CRSR RT}":PH$(1)=PH$(
   Ø)+"{12 CRSR RTs}"         :REM*229
16Ø P$(1)="{CTRL 5}"+LEFT$(P3$,P
   1+15)+P$(1)                :REM*26
165 S$="{CTRL 1}{CTRL 9}=======
   ================":SS$="{CTR
   L 1}{CTRL 9}={CTRL 4}{11 SPA
   CEs}{CTRL 1}:{CTRL 4}{11 SPA
   CEs}{CTRL 1}="             :REM*155
17Ø PRINT"{SHFT CLR}"S$:FORT=1TO
   4:PRINTSS$:NEXT            :REM*36
175 PRINTS$"{HOME}{CRSR DN}"P$(Ø
   )P$(1)                     :REM*147
18Ø BA$="{CTRL 7}{CTRL 9}{COMD *
   }{CRSR DN}{CRSR LF} {COMD *}
   {CRSR DN}{2 CRSR LFs}{2 SPAC
   Es}{COMD *}{CRSR DN}{3 CRSR
   LFs}{3 SPACEs}{COMD *}{CRSR
   DN}{4 CRSR LFs}{4 SPACEs}{CO
   MD I}{CRSR DN}{5 CRSR LFs}{C
   TRL Ø}{COMD *}{CTRL 9}{3 SPA
   CEs}{CRSR DN}{3 CRSR LFs}{CT
   RL Ø}{COMD *}{CTRL 9}{2 SPAC
   Es}{COMD I}{CRSR DN}{3 CRSR
   LFs}{CTRL Ø}{COMD *}{CTRL 9}
    {CRSR DN}{CRSR LF}{CTRL Ø}{
   COMD *}"                   :REM*4Ø
185 FORT=ØTO11:BB$=BB$+"{CTRL 9}
   {CRSR DN}{CRSR LF} ":NEXT
                              :REM*19
19Ø PRINT"{HOME}{CRSR DN}",,,BA$
   "{5 CRSR UPs}{2 CRSR RTs}"BB
   $                          :REM*66
195 FORT=1TO14:DI$=DI$+"{CTRL 1}
   {CRSR DN}{SHFT M}":NEXT
                              :REM*75
2ØØ FORT=1TO25:D$=D$+"{CTRL 1}{C
   OMD P}":E$=E$+"{CTRL 1}{COMD
    Y}":NEXT                  :REM*46
2Ø5 E$=E$+LEFT$(E$,28)+"{HOME}"
                              :REM*127
21Ø PRINTLEFT$(SP$,1Ø);D$;DI$"{C
   RSR RT}"E$                 :REM*254
215 F$="{CTRL 1}{COMD P}{SHFT R}
   {1Ø SHFT Fs}{CRSR DN}{13 CRS
   R LFs}{SHFT N}{3 CRSR RTs}{S
   HFT M}{CRSR DN}{5 CRSR LFs}{
   SHFT M}{4 CRSR RTs}{SHFT M}{
   CRSR DN}{5 CRSR LFs}{SHFT M}
   {4 CRSR RTs}{SHFT M}":REM*53
22Ø F$=F$+"{CRSR DN}{5 CRSR LFs}
   {COMD Y}{SHFT E}{SHFT D}{SHF
   T C}{11 SHFT Fs}"          :REM*7Ø
225 PRINTLEFT$(SP$,15),,"{3 CRSR
    LFs}"F$                   :REM*191
23Ø HH$="{COMD 4}{CTRL 9} {CRSR
   RT} {CRSR DN}{3 CRSR LFs}{3
   SPACEs}{CRSR DN}{3 CRSR LFs}
    {CRSR RT} {2 CRSR DNs}{3 CR
   SR LFs}"                   :REM*154
235 HO$="{CTRL 9}{3 SPACEs}{CRSR
    DN}{3 CRSR LFs} {CRSR RT} {
   CRSR DN}{3 CRSR LFs}{3 SPACE
   s}{2 CRSR DNs}{3 CRSR LFs}"
                              :REM*219
24Ø HR$="{CTRL 9} {COMD P}{COMD
   *}{CRSR DN}{3 CRSR LFs} {COM
   D Y}{CTRL Ø}{SHFT LB.}{CRSR
   DN}{3 CRSR LFs}{CTRL 9} {CTR
   L Ø}{COMD *}{CTRL 9}{COMD *}
   {2 CRSR DNs}{3 CRSR LFs}"
```



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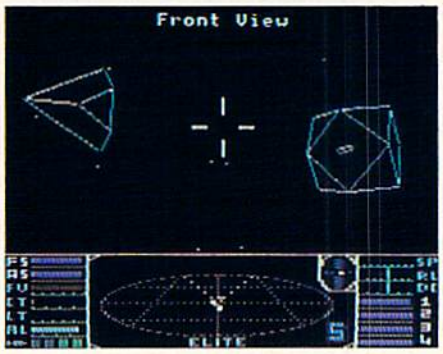

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Listing 1 continued.

```
                                :REM*82
245 HS$="{CTRL 9}{3 SPACEs}{CRSR
     DN}{3 CRSR LFs}{COMD I}{CTR
    L Ø}{SHFT *}{COMD I}{CRSR DN
    }{3 CRSR LFs}{CTRL 9}{3 SPAC
    Es}{2 CRSR DNs}{3 CRSR LFs}"
                                :REM*55
25Ø HE$="{CTRL 9}{3 SPACEs}{CRSR
     DN}{3 CRSR LFs} {CTRL Ø}{SH
    FT *}{CRSR DN}{2 CRSR LFs}{C
    TRL 9}{3 SPACEs}{2 CRSR DNs}
    {3 CRSR LFs}"               :REM*222
255 H$="{CTRL 5}"+HH$+HO$+HR$+HS
    $+HE$:PRINT"{HOME}{2 CRSR DN
    s}",,,"{7 CRSR RTs}"H$"{HOME
    }"                          :REM*185
26Ø X=1:CT=7:POKEV+21,27:POKE254
    ,Ø:POKE253,Ø                :REM*1Ø5
265 PRINTTM$;CT                 :REM*46
27Ø X=-X:POKE7Ø1,Ø:POKE698,1
                                :REM*23
275 XX=Ø:X1=1:IFX=1THENXX=1:X1=Ø
                                :REM*198
28Ø IFPEEK(1282)=176THENPOKE698,
    Ø:GOSUB4Ø5:GOTO265          :REM*47
285 GOSUB48Ø:IFBU<>ØTHEN28Ø
                                :REM*236
29Ø GOSUB32Ø:IFK=ØTHEN265:REM*89
295 PRINTTM$;CT:SYS49152:REM*254
3ØØ IFPEEK(253)=ØTHENGOSUB395:GO
    TO315                       :REM*2Ø5
3Ø5 IFBS$="Y"ANDL=1ANDPEEK(7Ø5)=
    ØTHENGOSUB415:GOTO315
                                :REM*228
31Ø GOSUB41Ø                    :REM*41
315 SYS49155:GOTO27Ø            :REM*2Ø6
32Ø POKE698,Ø:POKE7Ø1,1:POKE254,
    XX                          :REM*51
325 O1=XY:O2=YX:XY=PEEK(V+1+X):Y
    X=PEEK(V+2+X):K=1           :REM*244
33Ø IFPEEK(253)=ØTHEN35Ø:REM*179
335 L=L+1:IFL>1THENL=Ø:GOTO35Ø
                                :REM*16Ø
34Ø IFPEEK(1282)=176THENGOSUB4Ø5
    :POKE698,Ø:K=Ø:RETURN
                                :REM*1Ø1
345 IFABS(XY-O1)>16ORABS(YX-O2)>
    16THENGOSUB4ØØ:K=Ø:RETURN
                                :REM*124
35Ø POKE2Ø4Ø+XX,193             :REM*119
355 POKEV+8,PEEK(V+1+X)+3:POKEV+
    9,PEEK(V+2+X)-4             :REM*4
36Ø GOSUB48Ø:IFBU<>16THEN36Ø
                                :REM*91
365 GOSUB48Ø:IFBU<>ØTHEN365
                                :REM*13Ø
37Ø IFL=1THEN39Ø                :REM*115
375 POKE682,1:POKE683,1:POKE692,
    KL                          :REM*216
38Ø IFSW=14THENPOKE682,2:POKE683
    ,1:GOTO39Ø                  :REM*91
385 IFSW=13THENPOKE682,1:POKE683
    ,2:POKE692,BL               :REM*226
39Ø POKE2Ø4Ø+XX,192:RETURN
                                :REM*85
395 PRINTM$" MISSED ":GOSUB435:R
    ETURN                       :REM*2ØØ
4ØØ PRINTM$"{CRSR LF} TOO FAR ":
    GOSUB425:RETURN             :REM*2Ø7
4Ø5 PRINTM$"TOO LATE":GOSUB42Ø:R
    ETURN                       :REM*192
41Ø PRINTM$"{2 SPACEs}GOOD{2 SPA
    CEs}":BK=PEEK(7Ø5):RETURN
                                :REM*153
415 PRINTM$" NOBANK ":GOSUB43Ø:R
    ETURN                       :REM*138
42Ø IFPEEK(253)=1THENL=L+1
                                :REM*225
425 POKE254,X1:POKEV+9,PEEK(V+2+
    (-X))+7                     :REM*88
43Ø POKE253,Ø:GOSUB5ØØ          :REM*45
435 IFL=ØTHENRETURN             :REM*168
44Ø N(XX)=N(XX)+2:LL$=LEFT$(HL$,
    N(XX)):PRINTPH$(XX);LL$
                                :REM*237
445 IFN(XX)=1ØTHEN455           :REM*224
45Ø L=Ø:BK=Ø:RETURN             :REM*123
455 POKE698,Ø:GOSUB47Ø:PRINT"{HO
    ME}{6 CRSR DNs}{COMD 4} PRES
    S {CTRL 9} Y {CTRL Ø} TO PLA
    Y AGAIN"                    :REM*128
46Ø GETA$:IFA$<>"Y"THEN46Ø
                                :REM*65
465 RUN                         :REM*252
47Ø FORT=ØTO8:POKES+7,L(T):POKES
    +8,H(T)                     :REM*85
475 POKES+11,33:FORI=1TOD(T)*75:
    NEXT:POKES+11,32:NEXT:RETURN
                                :REM*146
48Ø JOY=PEEK(5632Ø+PEEK(254)):BU
    =JOYAND16:SW=JOYAND15:RETURN
                                :REM*221
485 POKEV+1Ø,(PEEK(V)+1)AND255:G
    OTO485                      :REM*12Ø
49Ø POKEV+21,59:POKEV+9,137
                                :REM*45
495 POKEV,1ØØ:POKEV+2,14Ø:POKEV+
    1,131:POKEV+3,131:POKEV+1Ø,1
    ØØ:POKEV+11,1Ø6             :REM*24Ø
5ØØ S=54272:POKES+13,249:POKES+1
    4,252:POKES+8,7:POKES+11,33:
    POKES+11,32                 :REM*117
5Ø5 FORT=1TO1ØØØ:NEXT:RETURN
                                :REM*236
51Ø DATA 4,48,2,5,152,2,5,71,2,4
    ,18Ø,2,4,48,4,4,18Ø,2,3,134,
    4,4,48,2,2,2Ø4,16           :REM*19
515 DATA 7,224,Ø,63,255,128,127,
    255,255,127,Ø,127,255,255,Ø,
    223                         :REM*215
52Ø DATA 255,Ø,24Ø,Ø,Ø,254,Ø,Ø,2
    54,Ø,Ø,254,Ø,Ø,254,Ø        :REM*58
525 DATA Ø,254,Ø,Ø,13Ø,Ø,Ø,255,2
    4,Ø,247,96,Ø,235,236,Ø
                                :REM*75
53Ø DATA 247,12Ø,Ø,25Ø,255,128,2
    45,85,254,255,255,255,127,25
    5,254,128                   :REM*19Ø
535 DATA 3Ø,Ø,Ø,3Ø,Ø,Ø,28,Ø,Ø,62
    ,Ø,Ø,62,Ø,Ø,62              :REM*71
54Ø DATA Ø,Ø,52,Ø,Ø,63,Ø,Ø,31,12
    8,Ø,31,255,128,31,255
                                :REM*246
545 DATA 192,31,224,Ø,63,128,Ø,3
    2,128,Ø,53,236,Ø,58,251,Ø
                                :REM*177
55Ø DATA 53,222,Ø,58,187,128,53,
    85,254,63,255,255,31,255,254
    ,77                         :REM*6
555 DATA Ø,Ø,Ø,Ø,Ø,Ø,3,255,128,1
    5,1,224,25,252,48,48        :REM*7
56Ø DATA 231,248,1Ø2,1ØØ,28,64,3
    6,156,2Ø7,36,62,2Ø7,36,158,2
    43,252                      :REM*62
565 DATA 2Ø6,2Ø1,191,254,2Ø1,25,
    158,194,73,158,2Ø1,9,158,73,
    72,68                       :REM*119
57Ø DATA 67,248,68,63,7,248,24,1
    12,48,15,255,224,3,255,128,1
    78                          :REM*23Ø
575 DATA Ø,Ø,Ø,Ø,Ø,127,63,255,25
    5,245,85,127,127,255,255,33
                                :REM*9
58Ø DATA 17,8,33,17,8,33,17,8,33
    ,17,8,18,17Ø,144,2Ø,68
                                :REM*222
585 DATA 8Ø,8,17Ø,32,9,17,32,1Ø,
    4Ø,16Ø,5,69,64,4,17Ø,64
                                :REM*93
59Ø DATA 5,17,64,2,17Ø,128,2,68,
    128,2,68,128,Ø,Ø,Ø,Ø        :REM*18
595 DATA Ø,Ø,Ø,Ø,127,Ø,1,241,192
    ,3,252,96,7,182,24Ø,7
                                :REM*129
6ØØ DATA 255,24Ø,5,255,2Ø8,7,127
    ,112,3,237,224,1,255,192,Ø,1
    27                          :REM*66
6Ø5 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
    ,Ø,Ø,Ø,Ø{7 SPACEs}          :REM*1Ø1
61Ø DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø
    ,Ø,Ø,Ø,77{6 SPACEs}         :REM*84
615 DATA 76,87,193,76,242,194,16
    9,Ø,16Ø,8Ø,153,167,2,136,2Ø8
    ,25Ø                        :REM*71
62Ø DATA 133,253,133,254,133,251
    ,169,22Ø,133,252,141,17Ø,2,1
    41,171,2                    :REM*74
625 DATA 169,253,141,175,2,169,2
    54,141,172,2,169,Ø,16Ø,24,15
    3,Ø                         :REM*2Ø1
63Ø DATA 212,136,2Ø8,25Ø,169,15,
    141,24,212,12Ø,169,7Ø,141,2Ø
    ,3,169                      :REM*138
635 DATA 192,141,21,3,88,96,173,
    3Ø,2Ø8,141,177,2,173,196,2,2
    4Ø                          :REM*125
64Ø DATA 6,238,Ø,2Ø8,238,8,2Ø8,1
    73,186,2,24Ø,2Ø,2Ø6,182,2,2Ø
    8                           :REM*224
645 DATA 2Ø,2Ø6,2,5,173,2,5,2Ø1,
    177,176,5,162,Ø,142,186,2
                                :REM*131
65Ø DATA 169,6Ø,141,182,2,173,18
    9,2,2Ø8,65,173,174,2,2Ø8,6,2
    Ø6                          :REM*92
655 DATA 9,2Ø8,76,136,192,238,9,
    2Ø8,166,254,24Ø,1,232,24,189
    ,Ø                          :REM*67
66Ø DATA 2Ø8,1Ø5,1Ø,141,8,2Ø8,56
    ,173,9,2Ø8,253,1,2Ø8,2Ø1,1,1
    44                          :REM*2
665 DATA 7,2Ø1,1Ø,176,11,76,187,
    192,238,9,2Ø8,169,1,76,181,1
    92                          :REM*111
67Ø DATA 2Ø6,9,2Ø8,169,Ø,141,174
    ,2,32,131,195,16Ø,1,162,2,19
    6                           :REM*244
675 DATA 254,24Ø,8,169,Ø,141,169
    ,2,76,2Ø8,192,169,1,141,169,
    2                           :REM*163
68Ø DATA 173,189,2,24Ø,8,173,169
    ,2,24Ø,3,76,43,193,177,251,7
    4                           :REM*214
685 DATA 176,2Ø,72,189,1,2Ø8,2Ø1
    ,112,24Ø,11,222,1,2Ø8,173,16
    9,2                         :REM*199
69Ø DATA 24Ø,3,2Ø6,9,2Ø8,1Ø4,74,
    176,2Ø,72,189,1,2Ø8,2Ø1,22Ø,
    24Ø                         :REM*4
695 DATA 11,254,1,2Ø8,173,169,2,
    24Ø,3,238,9,2Ø8,1Ø4,74,176,1
    2                           :REM*45
7ØØ DATA 72,189,Ø,2Ø8,2Ø1,24,24Ø
    ,3,222,Ø,2Ø8,1Ø4,74,176,12,7
    2                           :REM*248
7Ø5 DATA 189,Ø,2Ø8,2Ø1,24Ø,176,3
    ,254,Ø,2Ø8,1Ø4,162,Ø,136,2Ø8
    ,3                          :REM*135
71Ø DATA 76,191,192,238,175,2,24
    Ø,3,76,187,192,169,253,141,1
    75,2                        :REM*148
715 DATA 76,49,234,138,72,152,72
    ,174,18Ø,2,16Ø,Ø,136,2Ø8,253
    ,2Ø2                        :REM*47
72Ø DATA 2Ø8,248,1Ø4,168,1Ø4,17Ø
    ,96,169,Ø,16Ø,1Ø,153,187,2,1
    36,2Ø8                      :REM*198
725 DATA 25Ø,133,253,169,35,141,
    178,2,169,17,141,4,212,141,1
    89,2                        :REM*119
73Ø DATA 32,198,195,169,238,141,
    163,194,173,192,2,24Ø,3,76,2
    Ø8,194                      :REM*6
735 DATA 172,17Ø,2,174,171,2,136
    ,16,3,76,8Ø,194,173,9,2Ø8,2Ø
    8                           :REM*131
```

```
74Ø DATA 21,173,188,2,24Ø,3,76,6
     Ø,194,173,8,2Ø8,2Ø1,255,2Ø8,
     3                          :REM*4
745 DATA 76,169,194,76,8Ø,194,17
     3,19Ø,2,24Ø,8,2Ø6,19Ø,2,2Ø8,
     8                          :REM*219
75Ø DATA 76,6Ø,194,173,188,2,2Ø8
     ,3,76,63,194,173,9,2Ø8,2Ø1,1
     8Ø                         :REM*4
755 DATA 176,9Ø,2Ø1,15Ø,24Ø,118,
     2Ø1,97,2Ø8,117,173,191,2,2Ø8
     ,112,173                   :REM*95
76Ø DATA 8,2Ø8,2Ø1,236,176,11,17
     3,193,2,2Ø8,1ØØ,32,22Ø,195,7
     6,63                       :REM*238
765 DATA 194,2Ø1,254,176,5,2Ø5,1
     81,2,176,35,169,15,141,184,2
     ,173                       :REM*145
77Ø DATA 185,2,2Ø1,65,176,5,169,
     31,141,184,2,173,27,212,45,1
     84                         :REM*19
775 DATA 2,141,19Ø,2,238,19Ø,2,3
     2,131,195,76,54,194,169,1,13
     3                          :REM*148
78Ø DATA 253,169,252,141,8,2Ø8,3
     2,163,195,76,63,194,169,196,
     141,252                    :REM*253
785 DATA 7,169,32,141,29,2Ø8,169
     ,9,141,43,2Ø8,169,1,141,192,
     2                          :REM*46
79Ø DATA 141,194,2,32,131,195,32
     ,198,195,76,63,194,32,2Ø9,19
     5,2Ø6                      :REM*189
795 DATA 9,2Ø8,173,194,2,2Ø8,9,2
     38,178,2,173,178,2,141,1,212
                                :REM*218
8ØØ DATA 2Ø2,16,6,152,48,1Ø6,76,
     186,194,173,193,2,24Ø,7,173,
     9                          :REM*79
8Ø5 DATA 2Ø8,41,3,24Ø,85,165,253
     ,2Ø8,81,173,191,2,24Ø,5,173,
     192                        :REM*166
81Ø DATA 2,24Ø,68,173,8,2Ø8,2Ø1,
     26,176,8,169,238,141,163,194
     ,76                        :REM*81
815 DATA 163,194,2Ø1,255,2Ø8,29,
     173,192,2,2Ø8,19,173,9,2Ø8,2
     Ø1,6Ø                      :REM*17Ø
82Ø DATA 144,23,2Ø1,11Ø,176,19,3
     2,131,195,169,1,141,193,2,16
     9,2Ø6                      :REM*1Ø7
825 DATA 141,163,194,2Ø6,8,2Ø8,7
     6,186,194,32,2Ø9,195,32,22Ø,
     195,169                    :REM*234
83Ø DATA 1,141,191,2,141,188,2,3
     2,67,193,32,67,193,76,134,19
     3                          :REM*35
835 DATA 173,188,2,2Ø8,8,164,254
     ,177,251,41,16,2Ø8,74,76,12Ø
     ,193                       :REM*2Ø2
84Ø DATA 173,195,2,2Ø8,6,169,1,1
     41,186,2,96,169,17,141,176,2
                                :REM*145
845 DATA 165,254,2Ø8,3,238,176,2
     ,173,177,2,45,176,2,2Ø5,176,
     2                          :REM*32
85Ø DATA 24Ø,8,169,1,141,195,2,7
     6,128,193,169,Ø,141,189,2,16
     6                          :REM*2Ø1
855 DATA 254,2Ø8,7,232,134,254,2
     32,76,13,195,2Ø2,134,254,24,
     189,1                      :REM*224
86Ø DATA 2Ø8,1Ø5,5,141,9,2Ø8,96,
     169,2Ø6,141,71,195,169,238,1
     41,96                      :REM*2Ø3
865 DATA 195,173,9,2Ø8,141,185,2
     ,169,1,141,173,2,141,188,2,1
     73                         :REM*222
87Ø DATA 193,2,24Ø,3,76,6Ø,194,1
     6Ø,4,174,173,2,173,9,2Ø8,2Ø8
                                :REM*187
875 DATA 6,238,9,2Ø8,76,74,195,2
     38,9,2Ø8,173,8,2Ø8,2Ø1,255,2
     Ø8                         :REM*148
88Ø DATA 6,32,2Ø9,195,76,123,195
     ,238,8,2Ø8,32,67,193,2Ø2,2Ø8
     ,234                       :REM*73
885 DATA 2Ø6,173,2,136,2Ø8,211,2
     38,172,2,24Ø,16,169,238,141,
     71,195                     :REM*56
89Ø DATA 32,2Ø9,195,169,2Ø6,141,
     96,195,76,55,195,169,254,141
     ,172,2                     :REM*183
895 DATA 76,12Ø,193,169,2,141,1,
     212,169,185,141,5,212,169,99
     ,141                       :REM*86
9ØØ DATA 6,212,141,15,212,169,12
     9,141,4,212,141,18,212,169,1
     28,141                     :REM*2Ø9
9Ø5 DATA 4,212,96,169,Ø,141,6,21
     2,141,4,212,141,5,212,169,42
                                :REM*174
91Ø DATA 141,1,212,169,252,141,6
     ,212,169,17,141,4,212,169,16
     ,141                       :REM*1Ø9
915 DATA 4,212,141,194,2,96,169,
     2Ø6,141,63,194,169,238,141,7
     1,194                      :REM*7Ø
92Ø DATA 96,169,238,141,63,194,1
     69,2Ø6,141,71,194,96,169,194
     ,141,252                   :REM*173
925 DATA 7,169,Ø,141,43,2Ø8,169,
     48,141,29,2Ø8,96           :REM*148
```


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MONITORS

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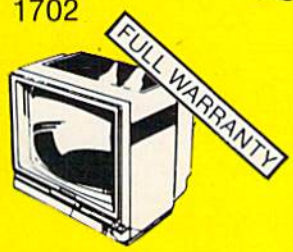

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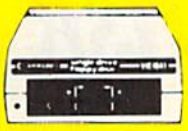

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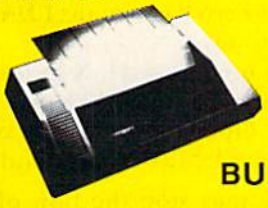

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Disk Reader

By PAOLO AGOSTINI

Here's a program that gives you the means to read whatever's on your disk, whether it's a sequential file, a machine language program or just a Basic program. And you can even print out that information.

Some Basic and machine language programs are extremely difficult to examine or decipher. There are various reasons for this. Some programs are loaded in memory sections where they overlap the machine code monitor; some are "hidden" in the RAM under ROM; some are copy-protected to prevent us from examining them.

Now, with Disk Reader, you can read data from almost any disk (the exceptions being those that are copy-protected). You may have the output printed to both the screen and the printer. Disk Reader has the following options.

1. The ability to read the disk directory without loading it into the computer's memory.
2. The ability to read any Basic program from disk, thus reconverting tokens into keywords.
3. The ability to read any machine code program, printing it in the form of addresses, hex numbers and assembly language opcodes—just as you'd see it with any ordinary machine language monitor.
4. The ability to read any sequential file from disk, skipping unprintable characters.

Due to the program's multipurpose tasks, the listing is long. Please pay careful attention when typing in Basic keywords (leave spaces where indicated) and assembly opcodes. Each opcode is accompanied by a so-called "opcode tag," which serves to specify the mode. These modes are explained below.

1. Opcode + an asterisk (*): Implied mode; for example, BRK, CLI, RTS, and so on.
2. Opcode + A: Absolute mode; JMP $C000, LDA $CA07, etc.
3. Opcode + B: Immediate mode; ORA #$40, LDA #$7F, etc.
4. Opcode + C: Zero Page mode; LDA $FB, AND $01, and so on.
5. Opcode + D: Absolute X-Indexed mode; STA $C010,X, etc.
6. Opcode + E: Absolute Y-Indexed mode; LDA $C010,Y, and so on.
7. Opcode + F: Indirect X-Indexed Zero Page mode; LDA ($FB,X), etc.
8. Opcode + G: Indirect Y-Indexed Zero Page mode; LDA ($FB),Y, and so on.
9. Opcode + H: X-Indexed Zero Page mode; LDA $40,X, etc.
10. Opcode + I: Y-Indexed Zero-Page mode; LDA $40,Y, and so on.

You may stop the flow of data at any time by pressing the S key, which stops the output and returns you to the main menu. Or, you may use the shift or Commodore key, which pauses the output for as long as it's pressed. (For especially long pauses, use the shift-lock key.)

To end the program, use option 5 of the main menu; should you use the run/stop key, the communication channels between the computer and disk drive (and eventually printer) will not be properly closed. R

Address all author correspondence to Paolo Agostini, Via Pascoli, 5/B, 35125 Padova, Italy.

Listing 1. *Disk Reader program.*

```
10Ø REM DISK READER          :REM*232
18Ø CLOSE4:CLOSE1:CLOSE15:OK=Ø:C
    LR                       :REM*56
19Ø PRINTCHR$(147):FORI=1TO1Ø:PR
    INTCHR$(17);CHR$(32);:NEXT
                             :REM*198
2ØØ PRINT"JUST A MOMENT PLEASE":
    GOSUB249Ø:T$=CHR$(147)+CHR$(
    13)+CHR$(13)             :REM*72
21Ø FORI=1TO13:T$=T$+CHR$(32):NE
    XT:FORI=1TO14:T$=T$+CHR$(45)
    :NEXT                    :REM*92
22Ø FORI=1TO12:T$=T$+CHR$(157):N
    EXT:T$=T$+"{CRSR DN}DISKREAD
    ER{CRSR DN}":FORI=1TO12
                             :REM*154
23Ø T$=T$+CHR$(157):NEXT:FORI=1T
    O14:T$=T$+CHR$(45):NEXT:T$=T
    $+CHR$(13)               :REM*234
24Ø GOSUB176Ø:IFDE<>5THENGOSUB12
    2Ø                       :REM*46
25Ø ONDEGOTO192Ø,13ØØ,31Ø,157Ø,2
    43Ø                      :REM*78
27Ø GET#1,A$:L=L+1:IFL=65535THEN
    L=Ø                      :REM*79
28Ø IFST<>ØTHEN228Ø          :REM*187
```

→

RUN It Right

C-64; C-128 (in C-64 mode)
Disk drive; printer optional

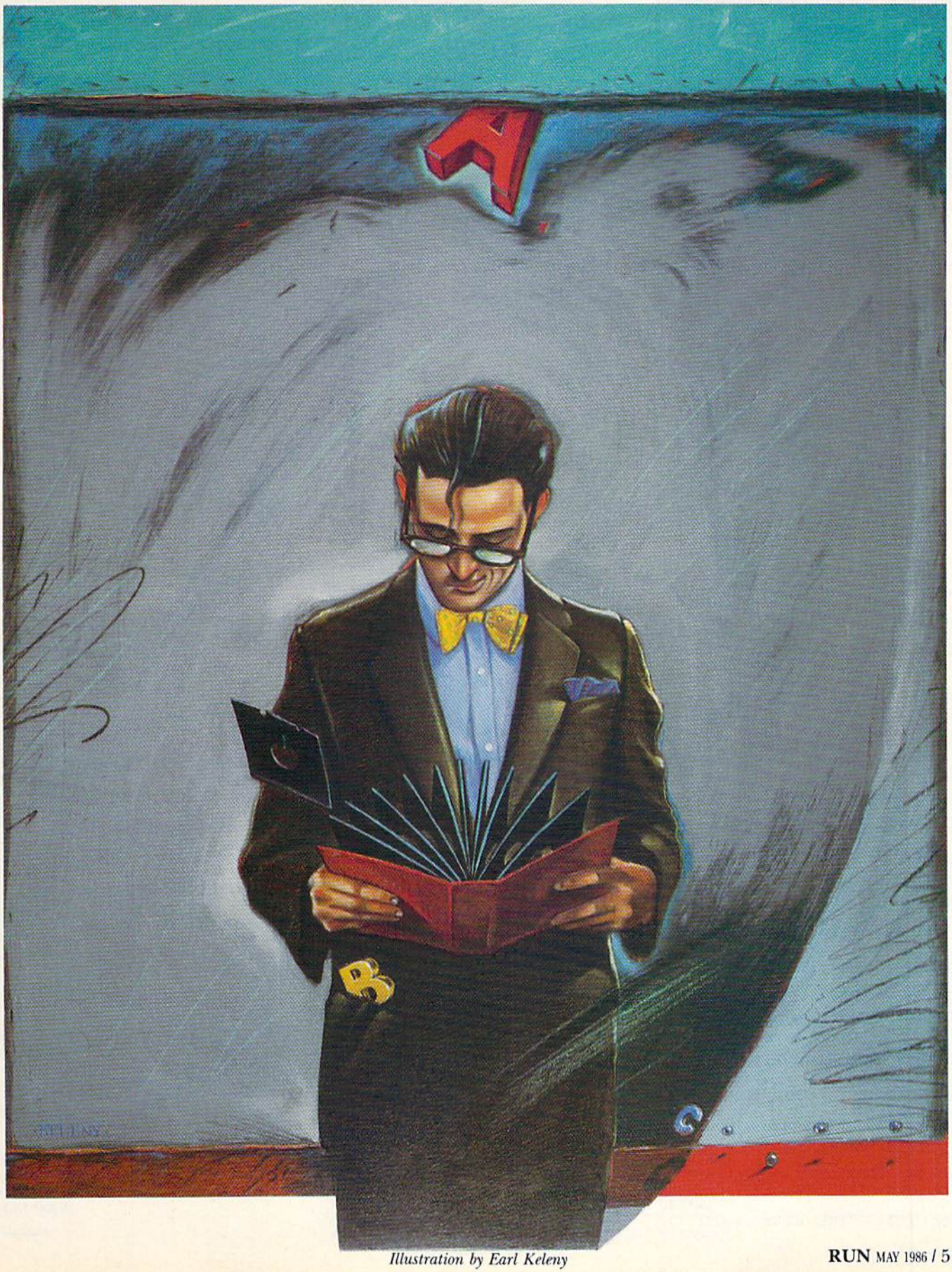

Illustration by Earl Keleny

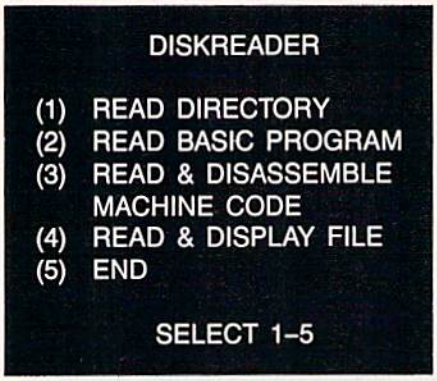

Photo 1. Diskreader program menu.

Listing 1 continued.

```
29Ø D=ASC(A$+CHR$(Ø)):RETURN
                          :REM*137
31Ø GOSUB234Ø:PRINTT$:PRINT:PRIN
    T                     :REM*2Ø7
32Ø IFOKTHENPRINT#4,NF$:PRINT#4:
    PRINT#4               :REM*185
33Ø PRINT" START ADDRESS:{3 SPAC
    Es}$";                :REM*173
34Ø IFOKTHENPRINT#4,"START ADDRE
    SS:{3 SPACEs}$";      :REM*115
35Ø GOSUB27Ø:L1=D:GOSUB27Ø:L2=D
                          :REM*73
36Ø L=L1+L2*256:D=L:GOSUB44Ø:PRI
    NTH$:PRINT:PRINT      :REM*89
37Ø IFOKTHENPRINT#4,H$:PRINT#4:P
    RINT#4                :REM*63
38Ø GOSUB27Ø:OP=D         :REM*189
39Ø GOSUB44Ø:A$=H$:GOSUB56Ø
                          :REM*149
4ØØ IFPEEK(653)THEN4ØØ   :REM*213
41Ø IFPEEK(197)=13THEN228Ø
                          :REM*247
42Ø GOTO38Ø               :REM*239
44Ø H$=""                 :REM*245
45Ø IFDTHENA=INT(D/16)    :REM*181
46Ø H$=MID$("Ø123456789ABCDEF",1
    +D-A*16,1)+H$         :REM*135
47Ø D=A:IFDGOTO45Ø        :REM*39
48Ø IFLEN(H$)<2THENH$=RIGHT$("ØØ
    "+H$,2)               :REM*25
49Ø IFLEN(H$)=3THENH$=RIGHT$("ØØ
    ØØ"+H$,4)             :REM*231
5ØØ RETURN                :REM*47
52Ø D=Ø:IFH$>""THENFORH=1TOLEN(H
    $)                    :REM*92
53Ø A=ASC(MID$(H$,H,1))-48
                          :REM*36
54Ø D=D*16+A+(A>9)*7:NEXT:RETURN
                          :REM*216
56Ø GOSUB64Ø              :REM*1ØØ
57Ø PRINTXX$:IFOKTHENPRINT#4,XX$
                          :REM*58
58Ø IFOT$="BRK"OROT$="RTS"THEN61
    Ø                     :REM*174
59Ø IFLEFT$(OT$,3)="JMP"THEN61Ø
                          :REM*228
6ØØ RETURN                :REM*148
61Ø PRINTDI$:IFOKTHENPRINT#4,DI$
                          :REM*68
62Ø RETURN                :REM*168
64Ø D=L-1:GOSUB44Ø:OX$=H$
                          :REM*158
65Ø IFLEN(OX$)<4THENOX$=RIGHT$("
    ØØØØ"+OX$,4)          :REM*26
66Ø OX$="."+OX$:XX$=OX$+CHR$(32)
    +A$+CHR$(32)          :REM*146
67Ø OT$=LEFT$(R$(OP),3)   :REM*14
68Ø U$=RIGHT$(R$(OP),1)   :REM*232
69Ø IFU$="*"THENGOSUB76Ø:RETURN
                          :REM*1ØØ
7ØØ IFU$="?"THENGOSUB76Ø:GOTO73Ø
                          :REM*21Ø
71Ø ONASC(U$)-64GOSUB78Ø,84Ø,89Ø
    ,91Ø,94Ø,97Ø,1Ø2Ø,1Ø7Ø,11ØØ,
    113Ø,119Ø             :REM*232
72Ø H1$="":H2$="":RETURN  :REM*8
73Ø IF(OP<32)OR(OP>127ANDOP<16Ø)
    OR(OP=34)THENRETURN   :REM*12Ø
74Ø XX$=XX$+CHR$(32)+CHR$(39)+CH
    R$(18)+CHR$(OP)+CHR$(146):RE
    TURN                  :REM*134
76Ø XX$=XX$+LEFT$(SP$,15)+OT$:RE
    TURN                  :REM*2
78Ø OT$=OT$+CHR$(32)+CHR$(36)
                          :REM*163
79Ø GOSUB27Ø:GOSUB44Ø:H1$=H$
                          :REM*123
8ØØ GOSUB27Ø:GOSUB44Ø:H2$=H$
                          :REM*165
81Ø XX$=XX$+H1$+CHR$(32)+H2$+LEF
    T$(SP$,1Ø)+OT$+H2$+H1$
                          :REM*75
82Ø RETURN                :REM*113
84Ø OT$=OT$+CHR$(32)+CHR$(35)+CH
    R$(36)                :REM*119
85Ø GOSUB27Ø:GOSUB44Ø:H1$=H$
                          :REM*183
86Ø XX$=XX$+H1$+LEFT$(SP$,13)+OT
    $+H1$                 :REM*243
87Ø RETURN                :REM*163
89Ø OT$=OT$+CHR$(32)+CHR$(36):GO
    TO85Ø                 :REM*1Ø9
91Ø OT$=OT$+CHR$(32)+CHR$(36):GO
    SUB79Ø                :REM*7
92Ø XX$=XX$+CHR$(44)+CHR$(88):RE
    TURN                  :REM*23
94Ø OT$=OT$+CHR$(32)+CHR$(36):GO
    SUB79Ø                :REM*37
95Ø XX$=XX$+CHR$(44)+CHR$(89):RE
    TURN                  :REM*61
97Ø OT$=OT$+CHR$(32)+CHR$(4Ø)+CH
    R$(36)                :REM*213
98Ø GOSUB85Ø              :REM*41
99Ø XX$=XX$+CHR$(44)+CHR$(88)+CH
    R$(41)                :REM*7
1ØØØ RETURN               :REM*37
1Ø2Ø OT$=OT$+CHR$(32)+CHR$(4Ø)+C
    HR$(36)               :REM*7
1Ø3Ø GOSUB85Ø             :REM*92
1Ø4Ø XX$=XX$+CHR$(41)+CHR$(44)+C
    HR$(89)               :REM*19Ø
1Ø5Ø RETURN               :REM*88
1Ø7Ø OT$=OT$+CHR$(32)+CHR$(36):G
    OSUB85Ø               :REM*36
1Ø8Ø XX$=XX$+CHR$(44)+CHR$(88):R
    ETURN                 :REM*184
11ØØ OT$=OT$+CHR$(32)+CHR$(36):G
    OSUB85Ø               :REM*66
111Ø XX$=XX$+CHR$(44)+CHR$(89):R
    ETURN                 :REM*222
113Ø OT$=OT$+CHR$(32)+CHR$(36)
                          :REM*2
114Ø GOSUB27Ø:OX=D:GOSUB44Ø:H1$=
    H$                    :REM*6
115Ø OX=OX+(OX>127)*256:D=OX+L:G
    OSUB44Ø:OX$=H$        :REM*94
116Ø XX$=XX$+H1$+LEFT$(SP$,13)+O
    T$+OX$                :REM*118
117Ø RETURN               :REM*2Ø8
119Ø OT$=OT$+CHR$(32)+CHR$(4Ø)+C
    HR$(36)               :REM*178
12ØØ GOSUB79Ø:XX$=XX$+CHR$(41):R
    ETURN                 :REM*2Ø8
122Ø PRINTT$:PRINT:PRINT:REM*12Ø
123Ø PRINT" OUTPUT TO SCREEN ";
                          :REM*28
124Ø PRINT"OR TO PRINTER (S/P)?"
    :PRINT                :REM*236
125Ø GETA$:IFA$<>"S"ANDA$<>"P"TH
    EN125Ø                :REM*12Ø
126Ø OK=Ø:IFA$="P"THENOK=1
                          :REM*198
127Ø IFA$="P"THENOPEN4,4:PRINT#4
                          :REM*98
128Ø RETURN               :REM*63
13ØØ GOSUB234Ø:PRINTT$:PRINT:PRI
    NT                    :REM*177
131Ø IFOKTHENPRINT#4,CHR$(14);NF
    $:PRINT#4:PRINT#4,CHR$(15)
                          :REM*95
132Ø PRINT" START ADDRESS:{3 SPA
    CEs}$";               :REM*143
133Ø GOSUB27Ø:L1=D:GOSUB27Ø:L2=D
                          :REM*33
134Ø L=L1+L2*256:D=L:GOSUB44Ø:PR
    INTH$:PRINT:PRINT     :REM*49
135Ø GOSUB27Ø:GOSUB27Ø    :REM*65
136Ø IFD=ØTHENPRINT:PRINT"E.O.F.
    ":GOTO228Ø            :REM*95
137Ø GOSUB27Ø:N1=D:GOSUB27Ø:N2=D
                          :REM*79
138Ø N=N1+N2*256:PRINTN;:IFOKTHE
    NPRINT#4,N;           :REM*65
139Ø GOSUB27Ø             :REM*181
14ØØ IFPEEK(653)THEN14ØØ:REM*219
141Ø IFPEEK(197)=13THEN228Ø
                          :REM*227
142Ø IFD=ØANDOKTHENPRINT#4
                          :REM*71
143Ø IFD=ØTHENPRINT:GOTO135Ø
                          :REM*217
144Ø IF(PEEK(212)<>ØORD<128)ANDO
    KTHENPRINT#4,CHR$(D);
                          :REM*123
145Ø IF(PEEK(212)<>ØORD<128)THEN
    PRINTCHR$(D);:GOTO147Ø
                          :REM*187
146Ø PRINTBA$(D-128);:IFOKTHENPR
    INT#4,BA$(D-128);     :REM*57
147Ø IFOKAND(D=58ORD=44)ANDPEEK(
    211)>65THEN152Ø       :REM*21
148Ø IFOK=ØAND(D=58ORD=44)ANDPEE
    K(211)>36THEN152Ø     :REM*85
149Ø IFOKANDPEEK(211)>75THEN152Ø
                          :REM*153
15ØØ IFOK=ØANDPEEK(211)>38THEN15
    2Ø                    :REM*59
151Ø GOTO139Ø             :REM*3
152Ø Z%=PEEK(212):PRINT:IFOKTHEN
    PRINT#4               :REM*73
153Ø TP$=LEFT$(SP$,LEN(STR$(N))+
    1):POKE212,Z%         :REM*85
154Ø PRINTTP$;:IFOKTHENPRINT#4,T
    P$;                   :REM*232
155Ø GOTO139Ø             :REM*44
157Ø GOSUB234Ø:PRINTT$:PRINT:PRI
    NT                    :REM*192
158Ø IFOKTHENPRINT#4,CHR$(14);NF
    $                     :REM*15Ø
159Ø IFOKTHENPRINT#4,CHR$(15):PR
    INT#4                 :REM*58
16ØØ IFOKTHENPRINT#4:CLOSE4:OK=Ø
                          :REM*22
161Ø IFOKTHENOPEN4,4,7    :REM*16Ø
162Ø NC%=Ø                :REM*98
163Ø GOSUB27Ø:IFOKTHENNC%=NC%+1
                          :REM*94
164Ø IFOKANDNC%>65THENNC%=Ø:PRIN
    T#4                   :REM*17Ø
165Ø IFPEEK(653)THEN165Ø  :REM*54
166Ø IFPEEK(197)=13THEN228Ø
                          :REM*222
167Ø IFOKANDD=34THENPRINT#4,CHR$
    (39);                 :REM*6Ø
168Ø IFD=34THENPRINTCHR$(39);:GO
    TO163Ø                :REM*198
169Ø IFOKANDD=13THENPRINT#4
                          :REM*156
17ØØ IFD=13THENPRINT:GOTO163Ø
                          :REM*128
171Ø IFOKAND((D>31ANDD<128)ORD>1
    59)THENPRINT#4,CHR$(D);
                          :REM*148
172Ø IF((D>31ANDD<128)ORD>159)TH
    ENPRINTCHR$(D);:GOTO163Ø
                          :REM*194
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Listing 1 continued.

```
173Ø PRINTCHR$(32);:IFOKTHENPRIN
     T#4,CHR$(32);        :REM*194
174Ø GOTO163Ø             :REM*88
176Ø PRINTT$:PRINT:PRINT:REM*15Ø
177Ø PRINTTAB(3);"(1) READ DIREC
     TORY":PRINT          :REM*24Ø
178Ø PRINTTAB(3);"(2) READ BASIC
      PROGRAM":PRINT      :REM*56
179Ø PRINTTAB(3);"(3) READ & DIS
     ASSEMBLE MACHINE CODE":PRIN
     T                    :REM*19Ø
18ØØ PRINTTAB(3);"(4) READ & DIS
     PLAY FILE":PRINT     :REM*31
181Ø PRINTTAB(3);"(5) END "
                          :REM*113
182Ø PRINT:PRINT:PRINTTAB(13)"SE
     LECT 1-5{3 SPACEs}";:REM*45
183Ø FORI=1TO15:GETA$:PRINTCHR$(
     157);CHR$(191);      :REM*29
184Ø IFA$<>""THEN189Ø     :REM*55
185Ø NEXT:FORI=1TO15:GETA$
                          :REM*155
186Ø PRINTCHR$(157);CHR$(18);CHR
     $(191);CHR$(146);    :REM*31
187Ø IFA$<>""THEN189Ø     :REM*85
188Ø NEXT:GOTO183Ø        :REM*2Ø9
189Ø IFA$<"1"ORA$>"5"THEN183Ø
                          :REM*1Ø9
19ØØ DE=VAL(A$):RETURN    :REM*15
192Ø PRINTT$:PRINT:PRINT" DISK N
     AME:";               :REM*227
193Ø IFOKTHENPRINT#4,"DISK NAME:
     ";                   :REM*11
194Ø CLOSE1:CLOSE15:FL=Ø:L$="":B
     $=""                 :REM*29
195Ø OPEN1,8,Ø,"$":OPEN15,8,15
                          :REM*85
196Ø INPUT#15,E1,E1$      :REM*171
197Ø IFE1THENPRINT:PRINT" DISK E
     RROR: "E1;E1$:GOTO228Ø
                          :REM*211
198Ø FORI=1TO33:GET#1,A$:REM*1Ø9
199Ø L$=L$+A$:NEXT:CLOSE1:PRINTL
     $:PRINT:PRINT:IFOKTHENPRINT
     #4,L$:PRINT#4        :REM*77
2ØØØ PRINTCHR$(18);" BLOCKS{5 SP
     ACEs}FILE NAME{1Ø SPACEs}FI
     LE TYPE"             :REM*229
2Ø1Ø IFOKTHENPRINT#4,"BLOCKS{3 S
     PACEs}FILE NAME{6 SPACEs}FI
     LE TYPE":PRINT#4     :REM*79
2Ø2Ø IFOKTHENPRINT#4,DI$:PRINT#4
                          :REM*61
2Ø3Ø OPEN1,8,Ø,"$"         :REM*253
2Ø4Ø GET#1,A$:GET#1,A$:GOSUB212Ø
                          :REM*141
2Ø5Ø GOSUB212Ø:IFFL=1THENCLOSE1:
     CLOSE15:GOTO228Ø     :REM*252
2Ø6Ø PRINTRIGHT$(SP$+STR$(L),4);
     LEFT$(SP$,5);        :REM*162
2Ø7Ø IFOKTHENPRINT#4,RIGHT$(SP$+
     STR$(L),4);LEFT$(SP$,5);
                          :REM*34
2Ø8Ø PRINTLEFT$(B$+SP$,23);FT$
                          :REM*212
2Ø9Ø IFOKTHENPRINT#4,LEFT$(B$+SP
     $,18);FT$            :REM*162
21ØØ GOTO2Ø5Ø             :REM*17Ø
212Ø B$="":GET#1,A$:GET#1,A$
                          :REM*24
213Ø GET#1,A$:L=ASC(A$+CHR$(Ø))
                          :REM*134
214Ø GET#1,A$:L=L+ASC(A$+CHR$(Ø)
     )*256                :REM*68
215Ø GET#1,A$:INPUT#15,E1,E1$:IF
     E1THENPRINT:PRINT" DISK ERR
     OR: "E1;E1$:GOTO228Ø :REM*4
216Ø IFA$=""THENFL=1:RETURN
                          :REM*222
217Ø IFA$<>CHR$(34)THEN215Ø
                          :REM*64
218Ø GET#1,A$             :REM*4Ø
219Ø IFPEEK(653)THEN219Ø:REM*112
22ØØ IFA$=CHR$(34)THEN222Ø:REM*2
221Ø B$=B$+A$:GOTO218Ø    :REM*216
222Ø GET#1,A$:IFA$=CHR$(32)THEN2
     22Ø                  :REM*188
223Ø FT$=A$               :REM*116
224Ø GET#1,A$:FT$=FT$+A$:GET#1,A
     $:FT$=FT$+A$         :REM*248
225Ø GET#1,A$:IFA$<>""THEN225Ø
                          :REM*118
226Ø RETURN               :REM*22
228Ø IFOKTHENPRINT#4      :REM*128
229Ø CLOSE1:CLOSE4:CLOSE15:OK=Ø
                          :REM*18Ø
23ØØ PRINT"{CRSR DN}":PRINTLEFT$
     (SP$,13);CHR$(18);"HIT ANY
     KEY"                 :REM*1ØØ
231Ø POKE198,Ø:WAIT198,1:POKE198
     ,Ø                   :REM*129
232Ø GOTO24Ø              :REM*27
234Ø PRINTT$:PRINT:PRINT:REM*221
235Ø INPUT" NAME OF FILE : ";NF$
     :PRINT               :REM*9
236Ø INPUT" FILE TYPE (PRG/SEQ/U
     SR) : ";TF$:PRINT"{CRSR DN}
      LOOKING FOR: ";NF$;",";TF$
                          :REM*187
237Ø OPEN15,8,15,"IØ"     :REM*2Ø9
238Ø OPEN1,8,5,"Ø:"+NF$+","+LEFT
     $(TF$,1)+",R"        :REM*65
239Ø INPUT#15,E1,E1$,E2,E3
                          :REM*19
24ØØ IFE1THENPRINT:PRINT" DISK E
     RROR: "E1;E1$:GOTO228Ø
                          :REM*131
241Ø RETURN               :REM*173
243Ø IFOKTHENPRINT#4      :REM*23
244Ø CLOSE4:CLOSE1:CLOSE15:OK=Ø
                          :REM*161
245Ø PRINTT$:FORI=1TO1Ø:PRINTCHR
     $(17);CHR$(29);:NEXT
                          :REM*233
246Ø PRINT" END OF PROGRAM !!{3
     CRSR DNs}"           :REM*131
247Ø END                  :REM*177
249Ø DIMBA$(76):FORI=ØTO75
                          :REM*147
25ØØ READBA$(I):NEXT      :REM*235
251Ø DATA"END ","FOR ","NEXT "
                          :REM*193
252Ø DATA"DATA ","INPUT#","INPUT
      ","DIM "," READ ","LET "
                          :REM*69
253Ø DATA"GOTO ","RUN","IF ","RE
     STORE ","GOSUB ","RETURN"
                          :REM*151
254Ø DATA"REM","STOP","ON ","WAI
     T ","LOAD ","SAVE ":REM*131
255Ø DATA"VERIFY ","DEF ","POKE
     ","PRINT#","PRINT","CONT"
                          :REM*177
256Ø DATA"LIST","CLR","CMD ","SY
     S ","OPEN ","CLOSE ","GET "
                          :REM*1Ø2
257Ø DATA"NEW","TAB("," TO ","FN
      ","SPC("," THEN "   :REM*15Ø
258Ø DATA"NOT"," STEP "," + ","
     - "," * "," / "," {UP ARROW
     } "," AND "," OR "   :REM*154
259Ø DATA"> ","=","<","SGN"," IN
     T"," ABS","USR","FRE"
                          :REM*82
26ØØ DATA"POS","SQR","RND","LOG"
     ,"EXP","COS","SIN"   :REM*98
261Ø DATA"TAN","ATN","PEEK","LEN
     ","STR$","VAL"       :REM*228
262Ø DATA"ASC","CHR$","LEFT$","R
     IGHT$","MID$","GO"   :REM*222
263Ø DATA***              :REM*152
264Ø READBA$:IFBA$<>"***"THENPRI
     NT"ERROR IN BASIC DATA":STO
     P                    :REM*142
266Ø DATABRK*,ORAF,?,?,?,ORAC,AS
     LC,?                 :REM*38
267Ø DATAPHP*,ORAB,ASL*,?,?,ORAA
     ,ASLA,?              :REM*98
268Ø DATABPLJ,ORAG,?,?,?,ORAH,AS
     LH,?                 :REM*18Ø
269Ø DATACLC*,ORAE,?,?,?,ORAD,AS
     LD,?                 :REM*42
27ØØ DATAJSRA,ANDF,?,?,BITC,ANDC
     ,ROLC,?              :REM*174
271Ø DATAPLP*,ANDB,ROL*,?,BITA,A
     NDA,ROLA,?           :REM*226
272Ø DATABMIJ,ANDG,?,?,?,ANDH,RO
     LH,?                 :REM*246
273Ø DATASEC*,ANDE,?,?,?,ANDD,RO
     LD,?                 :REM*14
274Ø DATARTI*,EORF,?,?,?,EORC,LS
     RC,?                 :REM*2Ø4
275Ø DATAPHA*,EORB,LSR*,?,JMPA,E
     ORA,LSRA,?           :REM*1Ø8
276Ø DATABVCJ,EORG,?,?,?,EORH,LS
     RH,?                 :REM*56
277Ø DATACLI*,EORE,?,?,?,EORD,LS
     RD,?                 :REM*5Ø
278Ø DATARTS*,ADCF,?,?,?,ADCC,RO
     RC,?                 :REM*42
279Ø DATAPLA*,ADCB,ROR*,?,JMPK,A
     DCA,RORA,?           :REM*22
28ØØ DATABVSJ,ADCG,?,?,?,ADCH,RO
     RH,?                 :REM*88
281Ø DATASEI*,ADCE,?,?,?,ADCD,RO
     RD,?                 :REM*96
282Ø DATA?,STAF,?,?,STYC,STAC,ST
     XC,?                 :REM*13
283Ø DATADEY*,?,TXA*,?,STYA,STAA
     ,STXA,?              :REM*167
284Ø DATABCCJ,STAG,?,?,STYH,STAH
     ,STXI,?              :REM*37
285Ø DATATYA*,STAE,TXS*,?,?,STAD
     ,?,?                 :REM*233
286Ø DATALDYB,LDAF,LDXB,?,LDYC,L
     DAC,LDXC,?           :REM*231
287Ø DATATAY*,LDAB,TAX*,?,LDYA,L
     DAA,LDXA,?           :REM*219
288Ø DATABCSJ,LDAG,?,?,LDYH,LDAH
     ,LDXI,?              :REM*215
289Ø DATACLV*,LDAE,TSX*,?,LDYD,L
     DAD,LDXE,?           :REM*11
29ØØ DATACPYB,CMPF,?,?,CPYC,CMPC
     ,DECC,?              :REM*127
291Ø DATAINY*,CMPB,DEX*,?,CPYA,C
     MPA,DECA,?           :REM*167
292Ø DATABNEJ,CMPG,?,?,?,CMPH,DE
     CH,?                 :REM*185
293Ø DATACLD*,CMPE,?,?,?,CMPD,DE
     CD,?                 :REM*83
294Ø DATACPXB,SBCF,?,?,CPXC,SBCC
     ,INCC,?              :REM*113
295Ø DATAINX*,SBCB,NOP*,?,CPXA,S
     BCA,INCA,?           :REM*71
296Ø DATABEQJ,SBCG,?,?,?,SBCI,IN
     CI,?                 :REM*39
297Ø DATASED*,SBCE,?,?,?,SBCD,IN
     CD,?                 :REM*151
298Ø DATA*                :REM*15
299Ø DIMR$(255),RT$(255):REM*2Ø7
3ØØØ FORT=ØTO255:READR$(T):NEXTT
                          :REM*2Ø5
3Ø1Ø READR$:IFR$<>"*"THENPRINT"E
     RROR IN OPCODE DATA":END
                          :REM*27
3Ø2Ø SP$="":DI$="":FORI=1TO39
                          :REM*95
3Ø3Ø SP$=SP$+CHR$(32):DI$=DI$+CH
     R$(45):NEXT          :REM*217
3Ø4Ø RETURN               :REM*37
```

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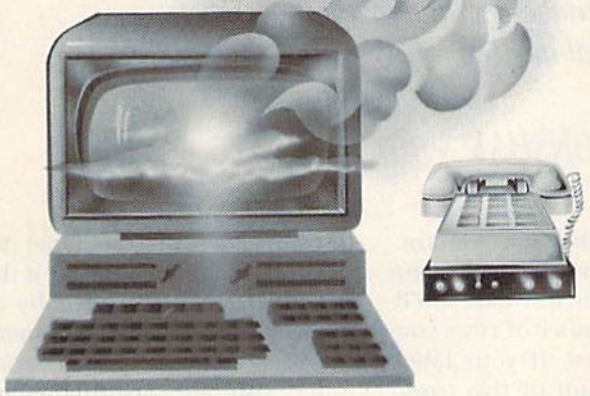

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Label Maker

With this handy program, you can combine expanded print, line centering, automatic numbering and graphics symbols to create professional-looking labels.

By MIKE KONSHAK

With the Label Maker program, you can create a label, then generate as many copies of it as you desire. Printing uniform labels gives your disk collection, personal possessions, and so on, a more professional appearance. And, if you use name tags at club functions, it's nice for them to be identical. You could also serialize your disk labels to keep track of program revisions and the like.

Label Maker was designed to print on one-up labels. If you have two-up labels, you can simply flip the label sheet over. If you ever need an enormous label, the program is capable of designing labels that use up to 66 rows and that are 70 characters wide.

That is the same size as a full piece of paper, but I would not recommend this as a one-page word processor; it would be too difficult to edit the lines.

Labels are generally separated by one line, or vertical space. Standard-size labels, which are most commonly available, are 15/16 of an inch wide by three to five inches long, and can hold five printed lines. Labels that are 3½ inches long are the most universal, because they can print 34 characters on one line, which is the normal number for the length of an address.

When designing your labels, you'll be asked to enter the number that's one greater than the maximum number of rows your label can contain. For example, if your label can print five lines, then enter 6. Next, you'll be asked for the number of rows you actually want printed. If your label can print a maximum of five rows, you should enter a number from 1 to 5; if 8, then 1 to 8.

Lastly, you'll be asked for the possible number of characters per row. This normally defaults to 34, for labels that are 3½ inches long. If you have labels of a different length, or if you've put your printer into Compressed mode or pitch, then you should adjust the desired number of characters per row accordingly.

You may save your labels on disk for recalling at a later date. Each label design is saved in individual sequential files. The filenames are preceded by a special code, LM] , which lessens the confusion if there are other sequential files on the same disk. Filenames cannot exceed 12 characters, since the code takes up four characters.

Besides printing text in standard pitch and in upper- and lowercase letters, Label Maker provides three special modes. Only one of these capabilities may be used in each line or row.

1. *Enhanced or Double Wide Print.* Most printers, including those by Commodore, have this capability. A line, or row, on the label will be printed in enhanced print if the data for the row is preceded by an up-arrow symbol (↑)—the exponent symbol to the left of your restore key. Since you are printing characters that are twice as wide, you can only use one-half the number of characters per line. A data line would look like this:

```
1 ? ↑Club Disk Library
```

2. *Centering of Text.* Text will be centered on the label if the data is preceded by a left-arrow symbol (←)—the key in the upper left-hand corner of your keyboard, just above the control key. To activate centering, a data line would look like this:

```
2 ? >Property of the Computer Club
```

3. *Serializing, or Auto-Numbering.* A serial number may be printed at the end of a line by adding the number sign (#) at the end of the data for that row. Numbering must start at any integer greater than zero. A data line that will print a serial number looks like the following:

```
3 ? 12/85 Library I.D. Number#
```

Since the Basic Input statement is used for data entry, you may not use commas, colons, semicolons or quotation marks in your lines of data. If you exceed 70 characters, you may experience input problems, because

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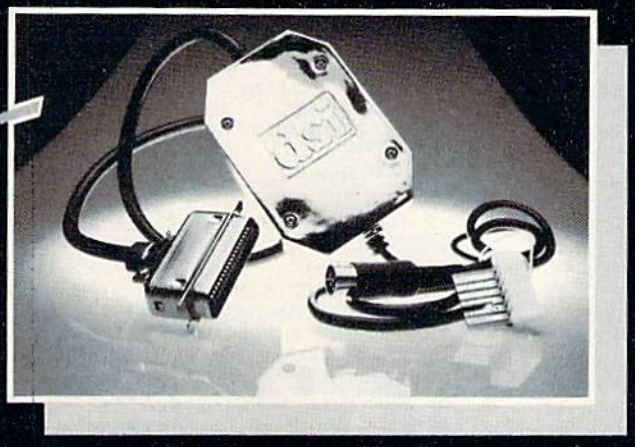

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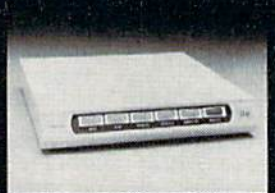
* Special interface or adapter cable required. Contact DSI.

The PPI works with all Centronics compatible parallel printers that utilize standard ASCII characters and command sets in the transparent mode.



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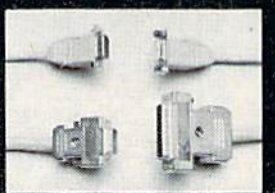

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the C-64 screen editor only accepts two lines when using input.

If you wish to replace a line of data with a blank line, then you must enter some single character (such as >) as the first character, then use the space bar to erase the remaining characters. Once you have saved and reloaded the label, the character you initially used for this deletion process will not appear when printing.

Once you've designed a label (be sure to save it) and have chosen to start printing it, you'll see the label on the screen. Double-width lines will be shown reversed; the text will be centered as it will appear; and if you've chosen serializing, a dummy serial number will be displayed to remind you that you've done so.

If you decide that that is not the label you had intended to print, enter a 0, or just press the return key without any entry, to exit the routine. The prompts in Label Maker are self-explanatory, so you shouldn't experience any problems.

If you run this program on the C-128, you must put it in C-64 mode or set up a 40-column window. Otherwise, the Data Input routine will not work correctly. R

Address all author correspondence to Mike Konshak, 4821 Harvest Court, Colorado Springs, CO 80917.

Listing 1. *Label Maker program.*

```
5 REM LABEL MAKER 1.2 PROGRAM (C
  )1985 BY MIKE KONSHAK  :REM*75
1Ø OPEN4,4,7:PRINTCHR$(14)
                         :REM*2Ø6
15 POKE53281,Ø:POKE5328Ø,Ø:PRINT
  "{SHFT CLR}{CTRL 8}"   :REM*23
2Ø RW=6:PR=5:NC=34:CR$=CHR$(13):
  B$=CHR$(32):FORI=1TO8Ø:S$=S$+
  B$:NEXTI               :REM*114
25 DIM PR$(66)           :REM*13
3Ø PRINT"{SHFT CLR} {CTRL 9} {SH
  FT L}ABEL {SHFT M}AKER (C)198
  5 BY {SHFT M}IKE {SHFT K}ONSH
  AK {CTRL Ø}"           :REM*182
35 PRINT"{CRSR DN} {SHFT T}HIS P
  ROGRAM WILL PRINT LABELS OUT
  ON"                    :REM*249
4Ø PRINT" YOUR PRINTER. {SHFT A}
  FTER DEFINING THE LABEL"
                         :REM*11Ø
45 PRINT" YOU WILL BE ABLE TO RU
  N AS MANY COPIES"      :REM*2Ø5
5Ø PRINT" OF THE LABEL AS YOU DE
  SIRE."                 :REM*236
55 PRINT"{CRSR DN} {SHFT P}OSSIB
  LE {SHFT U}SES:"       :REM*81
6Ø PRINTTAB(5)"{CRSR DN}{SHFT R}
  ETURN {SHFT A}DDRESS {SHFT L}
  ABELS"                 :REM*128
65 PRINTTAB(5)"{SHFT F}LOPPY {SH
  FT D}ISK {SHFT L}ABELS"
                         :REM*133
7Ø PRINTTAB(5)"{SHFT I}NVENTORY
  {SHFT I}{SHFT D} {SHFT L}ABEL
  S"                     :REM*12
75 PRINTTAB(5)"{SHFT S}WEEPSTAKE
  S {SHFT E}NTRIES"      :REM*159
8Ø PRINTTAB(5)"{SHFT H}I, {SHFT
  I}'M...{2 SPACEs}{SHFT N}AME
  {SHFT T}AGS"           :REM*3Ø
85 PRINT"{CRSR DN} {SHFT E}NHANC
  ED PRINT, {SHFT C}ENTERING AN
  D {SHFT S}ERIAL"       :REM*15
9Ø PRINT" {SHFT N}UMBERS MAY BE
  FORMATTED FO AN"       :REM*28
95 PRINT" INDIVIDUAL LINE.{CRSR
  DN} {SHFT P}RESS {CTRL 9}{SHF
  T A}NY {SHFT K}EY{CTRL Ø}":GO
  SUB1Ø5:GOTO375         :REM*63
1Ø5 GETA$:IFA$=""THEN1Ø5:REM*111
11Ø RETURN               :REM*168
12Ø PRINT"{SHFT CLR} {CTRL 9}{7
  SPACEs}{SHFT D}ESIGN {SHFT Y
  }OUR {SHFT O}WN {SHFT L}ABEL
  S{8 SPACEs}{CTRL Ø}":REM*254
125 PRINT"{CRSR DN} {SHFT P}OSSI
  BLE #{SHFT R}{SHFT O}{SHFT W
  }{SHFT S} PER {SHFT L}ABEL +
   1?";RW                :REM*2Ø1
13Ø PRINT"{CRSR UP}"TAB(29);:INP
  UTRW                   :REM*28
135 PRINT" #{SHFT R}{SHFT O}{SHF
  T W}{SHFT S} TO BE {SHFT P}R
  INTED ON {SHFT L}ABEL?";PR
                         :REM*161
14Ø PRINT"{CRSR UP}"TAB(29);:INP
  UTPR                   :REM*164
145 PRINT" {SHFT P}OSSIBLE #{SHF
  T C}{SHFT H}{SHFT A}{SHFT R}
  {SHFT A}{SHFT C}{SHFT T}{SHF
  T E}{SHFT R}{SHFT S} PER {SH
  FT R}OW?";NC           :REM*217
15Ø PRINT"{CRSR UP}"TAB(29);:INP
  UTNC                   :REM*17Ø
155 PRINT"{HOME}{CRSR DN} {SHFT
  E}NTER {SHFT D}{SHFT A}{SHFT
   T}{SHFT A} FOR {SHFT E}ACH
  {SHFT R}OW AS {SHFT P}ROMPTE
  D{3 SPACEs}"           :REM*129
16Ø PRINT" {SHFT S}ET {SHFT S}PE
  CIAL {SHFT M}ODES BY {SHFT M
  }AKING THE {SHFT F}IRST "
                         :REM*6
165 PRINT" {SHFT C}HARACTER ONE
  OF THE FOLLOWING:{7 SPACEs}"
                         :REM*93
17Ø PRINT"{5 SPACEs}{CTRL 9} {UP
   ARROW} {CTRL Ø} {SHFT E}NHA
  NCED, {SHFT D}OUBLE {SHFT W}
  IDE{5 SPACEs}"         :REM*88
175 PRINT"{5 SPACEs}{CTRL 9} {LE
  FT ARROW} {CTRL Ø} {SHFT C}E
  NTERED IN ROW"         :REM*237
18Ø PRINT" {SHFT I}F THE LABELS
  ARE TO BE {SHFT S}{SHFT E}{S
  HFT R}{SHFT I}{SHFT A}{SHFT
  L}{SHFT I}{SHFT Z}{SHFT E}{S
  HFT D},"               :REM*92
185 PRINT" ENTER THE '{SHFT P}OU
  ND {SHFT S}IGN' AS THE {SHFT
   L}{SHFT A}{SHFT S}{SHFT T}"
                         :REM*75
19Ø PRINT" CHARACTER IN THE ROW.
   {SHFT T}HE NUMBER WILL"
                         :REM*64
195 PRINT" BE PRINTED AT THE END
   OF THE ROW."          :REM*229
2ØØ PRINT"{5 SPACEs}{CTRL 9} # {
  CTRL Ø} {SHFT S}ERIALIZED {S
  HFT L}ABELS"           :REM*48
2Ø5 PRINT" {CTRL 9}{SHFT N}{SHFT
   O}{SHFT T}{SHFT E}: {SHFT O
  }NLY {SHFT O}{SHFT N}{SHFT E
  } {SHFT M}ODE {SHFT A}LLOWED
   PER {SHFT L}INE!!"    :REM*97
21Ø PRINT:FORI=1TOPR       :REM*3Ø
215 PRINTI;TAB(5)PR$(I):IFLEN(PR
  $(I))>34THENPRINT"{2 CRSR UP
  s}"TAB(3);:GOTO218     :REM*51
217 PRINT"{CRSR UP}"TAB(3);
                         :REM*2Ø9
218 INPUTPR$(I)          :REM*244
22Ø NEXTI:FL=1:CK=1       :REM*1Ø6
225 PRINT"{CRSR DN} {CTRL 9}{SHF
  T R}{CTRL Ø}EVISE {SHFT L}AB
  EL {CTRL 9}{SHFT S}{CTRL Ø}A
  VE {CTRL 9}{SHFT P}{CTRL Ø}R
  INT {CTRL 9}{SHFT E}{CTRL Ø}
  XIT"                   :REM*151
23Ø GOSUB1Ø5:IFA$="R"ORA$="{SHFT
   R}"THEN12Ø            :REM*148
235 IFA$="P"ORA$="{SHFT P}"THEN2
  6Ø                     :REM*51
24Ø IFA$="S"ORA$="{SHFT S}"THENG
  OSUB455:GOTO26Ø        :REM*Ø
245 IFA$="E"ORA$="{SHFT E}"THEN3
  75                     :REM*35
25Ø GOTO23Ø              :REM*236
26Ø PRINT"{SHFT CLR} {CTRL 9}{11
   SPACEs}{SHFT P}RINT {SHFT L
  }ABELS{13 SPACEs}{CTRL Ø}"
                         :REM*1Ø3
265 NM=Ø:FORI=1TOPR:     :REM*166
27Ø PRINT"{CRSR DN} {CTRL 9}{SHF
  T L}ABEL:{CTRL Ø} "NF$:PRINT
  "{CRSR DN}":FORI=1TOPR
                         :REM*37
275 IFLEFT$(PR$(I),1)="{UP ARROW
  }"THENPRINT"{CTRL 9}"MID$(PR
  $(I),2,INT(NC/2)):GOTO295
                         :REM*2Ø6
28Ø IFLEFT$(PR$(I),1)="{LEFT ARR
  OW}"THEN3ØØ            :REM*93
285 IFRIGHT$(PR$(I),1)="#"THENPR
  INTPR$(I)"9999":NM=1:GOTO295
                         :REM*236
29Ø PRINTLEFT$(PR$(I),NC):REM*87
295 NEXTI:GOTO3Ø5        :REM*1Ø8
3ØØ PRINTLEFT$(S$,(NC-LEN(PR$(I)
  ))/2)MID$(PR$(I),2,NC):GOTO2
  95                     :REM*2Ø5
3Ø5 PRINT"{4 CRSR DNs} {SHFT H}O
  W {SHFT M}ANY {SHFT L}ABELS
  [Ø TO {SHFT E}{SHFT X}{SHFT
  I}{SHFT T}]";:INPUTN:IFN=ØTH
  EN375                  :REM*218
31Ø IFNM=1THENPRINT"{CRSR DN} {S
  HFT S}TARTING {SHFT A}T {SHF
  T L}ABEL {SHFT N}UMBER ? 1{3
   CRSR LFs}";:INPUTNM:IFNM=ØT
  HEN375                 :REM*183
32Ø PRINT:FORI=1TON:PRINT" {SHFT
   P}{SHFT R}{SHFT I}{SHFT N}{
  SHFT T}{SHFT I}{SHFT N}{SHFT
   G}"I"{CRSR UP}":FORJ=1TOPR
                         :REM*165
325 IFLEFT$(PR$(J),1)="{UP ARROW
  }"THEN35Ø              :REM*218
33Ø IFLEFT$(PR$(J),1)="{LEFT ARR
  OW}"THEN365            :REM*145
335 IFRIGHT$(PR$(J),1)="#"THENPR
  INT#4,PR$(J)STR$(I+NM-1):GOT
  O355                   :REM*2
34Ø PRINT#4,LEFT$(PR$(J),NC):GOT
  O355                   :REM*153
35Ø PRINT#4,CHR$(14)MID$(PR$(J),
  2,INT(NC/2))CHR$(15) :REM*15
355 NEXTJ:FORK=1TORW-PR:PRINT#4,
  " ":NEXTK              :REM*218
36Ø NEXTI:GOTO375        :REM*49
365 PRINT#4,LEFT$(S$,(NC-LEN(PR$
  (J)))/2)MID$(PR$(J),2,NC):GO
  TO355                  :REM*228
375 PRINT"{SHFT CLR} {CTRL 9}{13
   SPACEs}{SHFT O}PTION {SHFT
  M}ENU{13 SPACEs}{CTRL Ø}"
                         :REM*18
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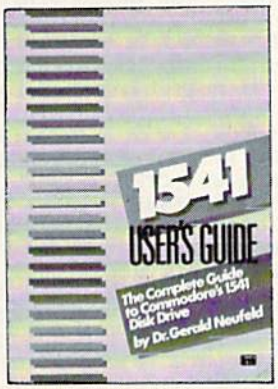

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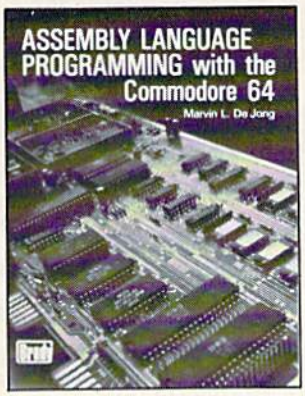

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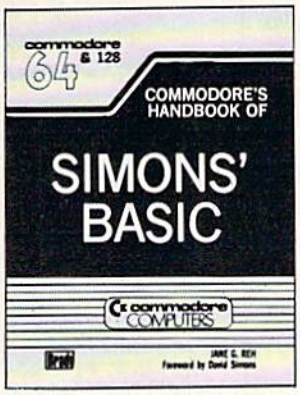

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Listing 1 continued.

```
38Ø PRINT"{CRSR DN}{8 SPACEs}{CT
    RL 9}{SHFT D}{CTRL Ø}ESIGN {
    SHFT L}ABEL"          :REM*221
385 PRINT"{CRSR DN}{8 SPACEs}{CT
    RL 9}{SHFT L}{CTRL Ø}OAD {SH
    FT L}ABEL {SHFT F}ROM {SHFT
    D}ISK"                :REM*74
39Ø IFFL<>ØTHEN PRINT"{CRSR DN}{
    8 SPACEs}{CTRL 9}{SHFT S}{CT
    RL Ø}AVE {SHFT L}ABEL TO {SH
    FT D}ISK"             :REM*37
395 IFFL<>ØTHEN PRINT"{CRSR DN}{
    8 SPACEs}{CTRL 9}{SHFT P}{CT
    RL Ø}RINT {SHFT L}ABELS"
                          :REM*122
4ØØ PRINT"{CRSR DN}{8 SPACEs}{CT
    RL 9}${CTRL Ø} {SHFT D}IRECT
    ORY"                  :REM*25
4Ø5 PRINT"{CRSR DN}{8 SPACEs}{CT
    RL 9}{SHFT Q}{CTRL Ø}UIT {SH
    FT P}ROGRAM"          :REM*72
41Ø PRINT"{2 CRSR DNs} {CTRL 9}{
    6 SPACEs}{SHFT P}RESS THE {S
    HFT A}PPROPRIATE {SHFT K}EY{
    5 SPACEs}"            :REM*2Ø1
415 GOSUB1Ø5:IFA$="Q"ORA$="{SHFT
     Q}"THENGOSUB575:CLOSE4:PRIN
    T"{SHFT CLR}":END     :REM*246
42Ø IFA$="P"ORA$="{SHFT P}"THEN2
    6Ø                    :REM*237
425 IFA$="L"ORA$="{SHFT L}"THENG
    OSUB575:GOSUB5ØØ:GOTO375
                          :REM*162
43Ø IFA$="D"ORA$="{SHFT D}"THEN1
    2Ø                    :REM*221
435 IFA$="S"ORA$="{SHFT S}"THENG
    OSUB455:GOTO375       :REM*8Ø
44Ø IFA$="$"THENGOTO6Ø5   :REM*23
445 GOTO415               :REM*64
455 PRINT"{CRSR DN} {SHFT S}AVE
    {SHFT L}ABEL {SHFT U}NDER {S
    HFT F}ILE? "NF$       :REM*2Ø2
46Ø PRINT"{CRSR UP}"TAB(22);:INP
    UTNF$:IFNF$=""THEN375:REM*49
465 IFLEN(NF$)>12THENPRINT"12 {S
    HFT C}HRS {SHFT M}AX":PRINT"
    {3 CRSR UPs}":GOTO455
                          :REM*154
47Ø OPEN15,8,15:PRINT#15,"SØ:LM]
     "+NF$:GOSUB55Ø:IFET=8THEN37
    5                     :REM*69
475 OPEN5,8,5,"Ø:LM] "+NF$+",S,W
    ":GOSUB55Ø:IFET=8THEN375
                          :REM*176
48Ø PRINT#5,RW;CR$;PR;CR$;NC:GOS
    UB55Ø:IFET=8THEN375   :REM*5
482 FORI=1TOPR:PR$=PR$(I):IFPR$=
    ""THENPR$=">"         :REM*2Ø5
485 PRINT#5,PR$:NEXTI:GOSUB55Ø:I
    FET=8THEN55Ø          :REM*216
49Ø GOSUB565:CK=Ø:RETURN :REM*49
5ØØ PRINT"{CRSR DN} {SHFT L}OAD
    {SHFT L}ABEL {SHFT F}ROM {SH
    FT F}ILE? "NF$        :REM*231
5Ø5 PRINT"{CRSR UP}"TAB(21);:INP
    UTNF$:IFNF$=""THEN375:REM*94
51Ø IFLEN(NF$)>12THENPRINT"12 {S
    HFT C}HRS {SHFT M}AX":PRINT"
    {3 CRSR UPs}":GOTO5ØØ
                          :REM*245
515 OPEN15,8,15:OPEN5,8,5,"Ø:LM]
     "+NF$+",S,R":GOSUB55Ø:IFET=
    8THEN375              :REM*5
52Ø IFEN=62THENGOSUB555:GOTO375
                          :REM*192
525 INPUT#5,RW,PR,NC:GOSUB55Ø:IF
    ET=8THEN55Ø           :REM*59
53Ø FORI=1TOPR:INPUT#5,PR$(I):IF
    PR$(I)=">"THENPR$(I)=""
                          :REM*46
532 NEXTI:GOSUB55Ø:IFET=8THEN55Ø
                          :REM*13Ø
535 S=ST:IFS<>ØTHEN54Ø    :REM*91
54Ø GOSUB565:FL=1:RETURN:REM*234
55Ø INPUT#15,EN,EM$,ET,ES:IFEN<2
    ØOREN=62THENET=Ø:RETURN
                          :REM*44
555 PRINT"{CRSR DN} {CTRL 9}{SHF
    T D}ISK {SHFT E}{2 SHFT Rs}{
    SHFT O}{SHFT R}{CTRL Ø}"EN"{
    CRSR LF}, "EM$","ET"{CRSR LF
    },"ES:ET=8            :REM*127
56Ø PRINT" {SHFT P}RESS {CTRL 9}
    {SHFT A}NY {SHFT K}EY{CTRL Ø
    } TO {SHFT C}ONTINUE":GOSUB1
    Ø5                    :REM*166
565 CLOSE5:CLOSE15:RETURN:REM*89
575 IFCK=ØTHENRETURN      :REM*1
58Ø PRINT"{CRSR DN} {SHFT Y}OU {
    SHFT H}AVE {SHFT N}{SHFT O}{
    SHFT T} {SHFT S}AVED {SHFT Y
    }OUR {SHFT C}HANGES!":REM*32
585 PRINT" {SHFT P}RESS {CTRL 9}
    {SHFT S}{CTRL Ø}AVE {SHFT L}
    ABEL {CTRL 9}{SHFT C}{CTRL Ø
    }ONTINUE"             :REM*141
59Ø GOSUB1Ø5:IFA$="C"ORA$="{SHFT
     C}"THENRETURN        :REM*162
595 IFA$="S"ORA$="{SHFT S}"THENG
    OSUB455:RETURN        :REM*247
6Ø5 OPEN15,8,15:OPEN5,8,Ø,"$Ø":P
    RINT"{SHFT CLR}":GOSUB55Ø:IF
    ET=8THEN375           :REM*163
61Ø GET#5,A1$,A2$          :REM*28
615 GET#5,A1$,A2$          :REM*33
62Ø GET#5,A1$,A2$          :REM*38
625 IFA1$<>""THENAØ=ASC(A1$)
                          :REM*179
63Ø IFA2$<>""THENAØ=AØ+ASC(A2$)*
    256                   :REM*138
635 PRINTMID$(STR$(AØ),2);TAB(3)
    ;                     :REM*221
64Ø GET#5,A2$:IFST<>ØTHEN685
                          :REM*164
645 IFA2$<>CHR$(34)THEN64Ø
                          :REM*15
65Ø GET#5,A2$:IFA2$<>CHR$(34)THE
    NPRINT"{CTRL 9}"A2$"{CTRL Ø}
    ";:GOTO65Ø            :REM*6Ø
655 GET#5,A2$:IFA2$=CHR$(32)THEN
    655                   :REM*69
66Ø PRINTTAB(2Ø);:A3$="":REM*2Ø6
665 A3$=A3$+A2$:GET#5,A2$:IFA2$<
    >""THEN665            :REM*1Ø3
67Ø PRINTLEFT$(A3$,3)      :REM*1Ø
675 GETA$:IFA$<>""THENGOSUB695
                          :REM*223
68Ø IFST=ØTHEN615          :REM*9Ø
685 PRINT" BLOCKS FREE";:AØ=Ø
                          :REM*233
69Ø CLOSE5:CLOSE15:PRINTTAB(25)"
    {SHFT P}RESS {CTRL 9}{SHFT A
    }{SHFT N}{SHFT Y} {SHFT K}{S
    HFT E}{SHFT Y}{CTRL Ø}":GOSU
    B1Ø5:GOTO375           :REM*5Ø
695 GOSUB1Ø5:RETURN       :REM*249
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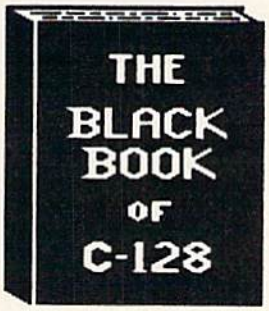

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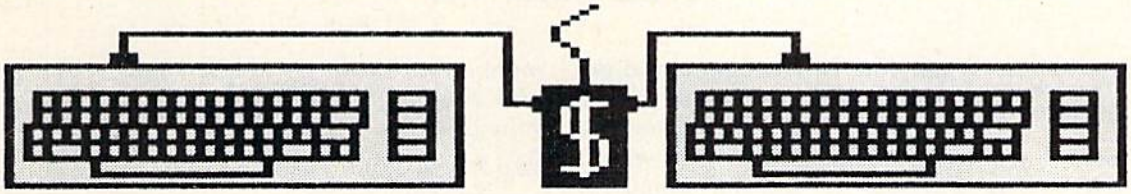

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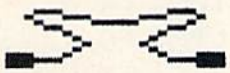

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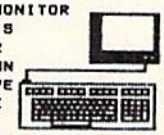

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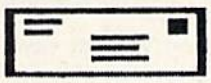

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Hide and Seek With Basic

Have you been plotting to protect your programs from prying eyes? Here's a short, easy-to-use method that stealthily hides your Basic programs and disables the stop key.

By KENNETH FLEE

When you list a program and get a one-line listing that reads 1 SYS 2063, or something similar, the program is usually compiled or written in assembly or machine language. The following technique allows you to write your program in Basic and then hide it to look like an assembly language or compiled program.

In addition, the stop key is disabled to keep users from exiting your program at points other than those you intend. If users list your modified program, they will see only SYS 2065—but your program will run as usual!

The Method

First, write and debug your Basic program and be certain it runs properly. Don't use program line numbers 1 and 2—these will be used to hide your program.

Now, add the following two lines to the beginning of your program.

```
1 SYS 2065
2 REMXXXXXXXXXXXXXXXX
```

Be sure to type them exactly as shown, including the single space after SYS in the first line and exactly 16 Xs immediately after REM in line 2.

Next, add the following nine lines to the end of your program. I've used line number 9900 as the starting line number, but you may use any line number you wish—as long as these nine lines are the last nine lines in your program.

```
9900 X=2060:POKE X+5,169:POKE
     X+6,225
9910 POKE X+7,141:POKE X+8,40
9920 POKE X+9,3:POKE X+10,169
9930 POKE X+11,34:POKE X+12,141
9940 POKE X+13,12:POKE X+14,8
9950 POKE X+15,169:POKE X+16,8
9960 POKE X+17,141:POKE X+18,13
9970 POKE X+19,8:POKE X+20,96
9980 POKE X,0:POKE X+1,0
```

Be sure to save your program at this point, since the next step will make the program unlistable and unalterable to everyone, including yourself!

Are you ready for a little magic? All right! Now type, in Direct mode (use no line number), the following line:

```
GOTO 9900
```

If you used some other line number for line 9900, use that line number instead. Now list your program. All you will see is 1 SYS 2065—the rest of your Basic program is hidden, safe from prying eyes.

Don't run the program yet, but save the modified version under a name different from that of the unmodified version. The new version can be loaded and saved just like any other Basic program—it just can't be listed.

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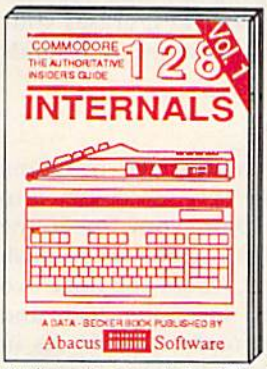

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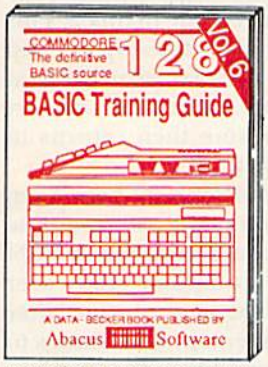

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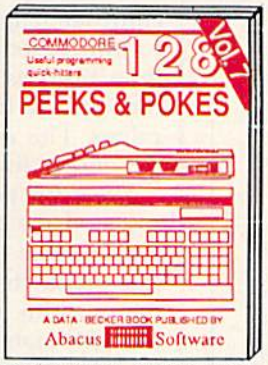

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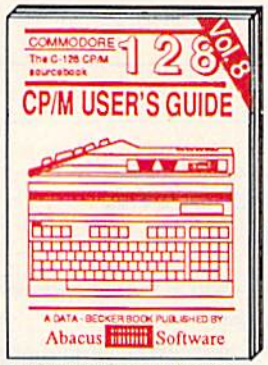

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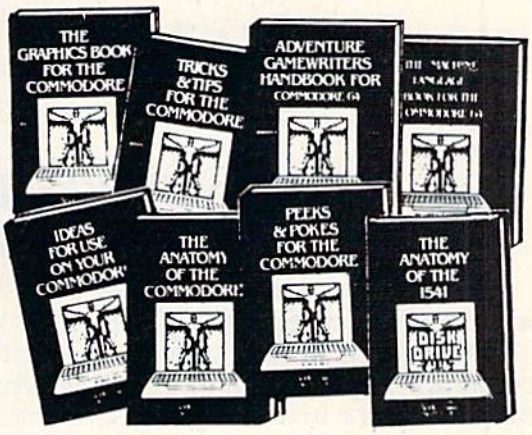
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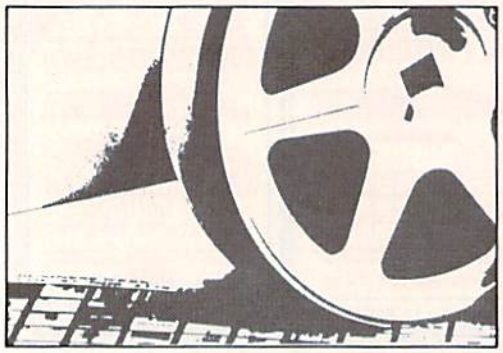

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You can now run the program to check execution, but if you didn't allow a graceful exit, you'll have to turn off your computer to end the program, since the stop key has been disabled.

To end a program you intend to hide, using the hidden Basic technique, include the following line as the Exit statement.

```
XXXX POKE 808,237:NEW:END
```

You would use an appropriate line number in place of the XXXX, of course. This program line restores the use of the stop key, erases your program from memory and ends execution.

How It Works

When you modify the program, you're tricking the computer into thinking there is only one line in the program it is listing. You accomplish this in line 9980, where you Poke two zero bytes into locations 2060 and 2061. You also replace the 16 Xs in line 2 with a short machine language routine.

When you run the program, the SYS 2065 in line 1 goes to the machine language routine in line 2. This routine first disables the stop key and then restores the two zero bytes at the end of line 1 to their correct values. The routine then returns to the end of line 1.

Since the pointers now have been restored, the computer can "see" line 2. But since line 2 contains a REM statement, the computer skips over the machine language routine after the REM statement and continues to the next program line—the first line of your Basic program.

Everything then runs as it originally did, except that a user cannot use the stop key to break into program execution. Even if the program bombs, the listing function has been messed up so that the screen will show only garbage if a user attempts to list the program at that point.

For the assembly language programmers among you, here is the routine inserted into line 2:

```
0811  A9 E1     LDA  #$E1
0813  8D 28 03  STA  $0328
0816  A9 22     LDA  #$22
0818  8D 0C 08  STA  $080C
081B  A9 08     LDA  #$08
081D  8D 0D 08  STA  $080D
0820  60        RTS
```


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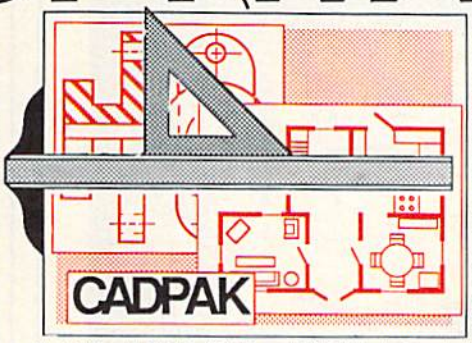

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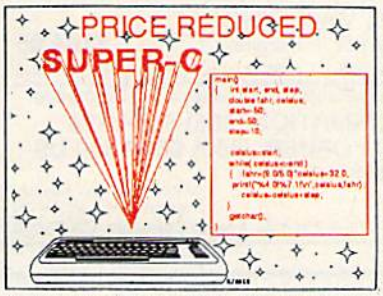

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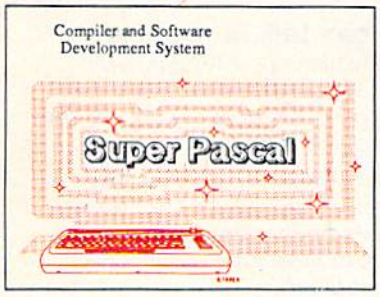

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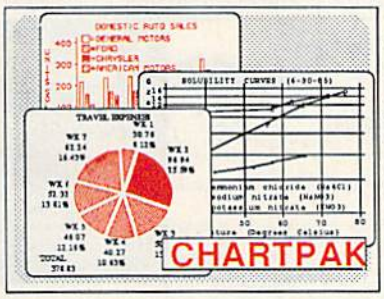

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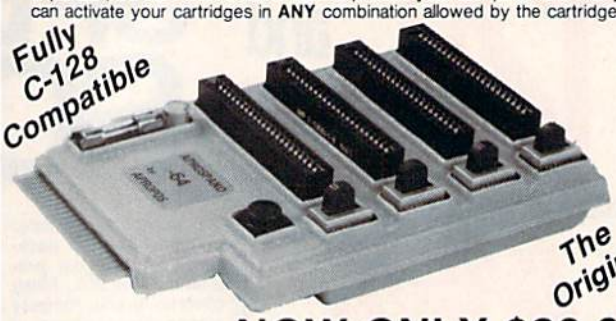

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Easy Data Entry

By JIM ALLEN

Are you fed up with fiddling with those irksome Data statements? It's time to take the tedium out of data entry.

While typing in line after line of numeric Data statements, your fingers spend most of their time on the top row of keys, except when typing in the word DATA and commas. This machine language program, Comma Generator, changes the space bar into a comma generator, making it easy to type in commas, and uses the back-arrow key (←) to type in the word DATA.

Once you start typing in Data statements, you won't have to move your fingers off the top row of keys until you are through. This program works only for Data statements that don't contain spaces.

Using the Program

First type in Listing 1, the Basic loader program. Be sure to save it before running it, as the program erases itself after it has run. Once it's been run, the Comma Generator program is ready to be called upon.

When you enter a program with a great number of Data statements, load and run the Comma Generator program first. This way, when you're ready to enter Data statements, you won't have to save and reload the program on which you're working.

When you are ready to enter numeric or alphanumeric data (without any spaces), type: SYS679 and hit the return key. Thereafter, when you press the space bar, a comma will appear on the screen, and when you press the back-arrow key (←), the word DATA will print on the screen.

To disable the utility, hit the run/stop and the restore keys simultaneously. You can reenable the program with SYS679 without rerunning the Basic loader.

How It Works

The SYS command transfers control of the microprocessor to memory location 679 ($02A7 hex). The instructions at this location modify the hardware interrupt request (IRQ) vector and then return control to Basic.

The new IRQ vector sends the interrupt request to the machine language program at memory location 692 ($02B4 hex), to see if you are pressing the keys you want to modify. When it encounters either the space bar or the back-arrow key, that key's normal function is erased (that is, the cursor moves left), and the comma or the word DATA is added over the normal character. After that, program operation continues with the IRQ at memory location 59953 ($EA31). R

Address all author correspondence to Jim Allen, 941 Papaya Place, Brea, CA 92621.

Listing 1. *Basic loader for Comma Generator program.*

```
11Ø REM{7 SPACEs}COMMA GENERATOR    :REM*236
12Ø REM{5 SPACEs}VERSION 1.2 5/18/84
                                    :REM*23Ø
13Ø REM{8 SPACEs}BY JIM ALLEN       :REM*196
15Ø A=679-1                         :REM*21Ø
16Ø A=A+1                           :REM*242
17Ø READ D:IF D=Ø THEN 19Ø          :REM*126
18Ø POKE A,D:GOTO 16Ø                :REM*22
19Ø PRINT CHR$(147)TAB(8Ø)"{CTRL 9}SYS679{C
    TRL Ø} TO ENABLE                :REM*96
2ØØ NEW                             :REM*82
21Ø DATA 12Ø, 169, 18Ø, 141, 2Ø, 3 :REM*118
22Ø DATA 169, 2, 141, 21, 3, 88     :REM*166
23Ø DATA 96, 165, 197, 2Ø1, 6Ø, 24Ø:REM*22Ø
24Ø DATA 17, 162, 17, 142, 185, 2   :REM*34
25Ø DATA 2Ø1, 57, 24Ø, 29, 162, 29  :REM*1ØØ
26Ø DATA 142, 194, 2, 76, 49, 234   :REM*157
27Ø DATA 169, 14, 141, 185, 2, 169  :REM*171
28Ø DATA 157, 141, 119, 2, 169, 44   :REM*71
29Ø DATA 141, 12Ø, 2, 169, 2, 133    :REM*19
3ØØ DATA 198, 2Ø8, 232, 169, 5, 141 :REM*23
31Ø DATA 194, 2, 169, 157, 141, 119:REM*2Ø1
32Ø DATA 2, 162, 5, 189, 25Ø, 2     :REM*235
33Ø DATA 157, 119, 2, 2Ø2, 2Ø8, 247:REM*153
34Ø DATA 169, 5, 133, 198, 2Ø8, 2Ø5  :REM*37
35Ø DATA 68, 65, 84, 65, Ø           :REM*77
```

RUN It Right

C-64; C-128 (in C-64 mode)

Digit Fidget

By MICHAEL BROUSSARD and JIM BORDEN

Are you sick of multi-digit decimals? Isn't it time your dollars and cents made sense? Here's a program that uses string functions to format numeric output.

This article discusses a technique for sprucing up numeric output with just a little extra programming. It also provides a general-purpose subroutine that, when incorporated into your own programs, allows you to do powerful number formatting. Consider the following program statement:

```
100 PRINT "THE COST WAS $";C
```

If the value of the variable C is 12.347, the above statement will print:

```
THE COST WAS $ 12.347
```

This format may be acceptable for most applications, but if you are as obsessed by neatness and order as I am, you'll prefer seeing the output like this:

```
THE COST WAS $12.35
```

In the second example, notice that there's no space between the dollar sign and the number, and that the fraction has been rounded to the nearest cent. The trick is to take the numeric value in C (12.347) and convert it to a string value that looks the way you want it to look ("$12.35"). Once you have built such a string (called S$, for example), you can get the output you want with the statement:

```
100 PRINT "THE COST IS ";S$
```

S$ must be built in stages. The obvious first step is to start off with a dollar sign:

```
10 S$="$"
```

Next, you want to isolate the dollar part of C (the 12 of the 12.347). This can be done with the statement:

```
15 D=INT(C)
```

Now you have the dollar amount stored in the variable D. Converting it to a string is easy enough:

```
20 D$=STR$(D)
```

The STR$ built-in function converts a number to a string, but the result contains a leading blank if the number is positive, a minus sign if it is negative. If you assume your program will handle only positive dollar amounts, you don't want the extra space, so you can discard it when you add the dollar amount to your output string:

```
25 S$=S$+MID$(D$, 2)
```

The above statement means, "take the rest of D$, starting at the second character (this skips the leading blank), and add it to the end of S$." S$ now contains the string "$12". The next step is to add the decimal point:

```
30 S$=S$+"."
```

Now S$ contains "$12." and it is time to worry about the cents part. The assignment statement:

```
35 N=C-D
```

means "subtract the dollars (D) from the cost (C) and put the result in the variable N." With respect to the example, subtracting the dollars (12) from the cost (12.347) leaves the cents (.347) in N. You are interested in working with a whole number of cents, so you must multiply the fraction stored in N by 100. (In the example, multiplying .347 by 100 gives you 34.7 cents.) To round to the nearest cent, add half a cent and use the INT function to discard any fraction. You can accomplish all this with the statement:

```
40 N=INT((N*100)+.5)
```

This leaves you with the value 35 (cents) in N, which you can then convert to a string:

```
45 N$=STR$(N)
```

The last step is to append the cents to the end of S$:

```
50 S$=S$+MID$(N$, 2)
```

You had to go through a lot of program steps, but S$ now contains the string "$12.35".

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In the above example, each part of the conversion, from number to formatted string, was illustrated with a separate program statement so that each step would be easier to understand. The following short program is a more compact version of the same algorithm.

```
5 INPUT "INPUT AN EXAMPLE COST";C
10 S$ = "$" + MID$(STR$(INT(C)), 2) + "."
15 N$ = MID$(STR$(INT(((C - INT(C))
   *100) + .5)), 2)
20 IF LEN(N$) = 1 THEN N$ = "0" + N$
25 S$ = S$ + N$
30 PRINT "THE COST WAS ";S$ : END
```

Line 20 of the above sample program takes care of those instances when the cents part of the cost is less than 10. When that happens, insert an extra 0 so that the cents string is two characters long.

Numeric Editing

The rest of this article discusses a subroutine you can use in your own programs to make editing numbers a snap. It is more flexible than the sort of program shown above, and it's easy to use.

You must put the value to be edited in a variable called PN. Next, you set the string variable PM$ to a mask, or format, describing how you want the output to look (a complete discussion of masks, along with examples, appears below).

Once these two variables are set, you invoke the subroutine with a Gosub statement. The edited result will be stored in the variable PR$. That's all there is to it! Let's look at an example.

Suppose you wish to print the value of a variable called X, with five places to the left of the decimal and three places to the right. The following program fragment shows how it would be done.

```
100 PN = X : REM INIT SUBROUTINE
    VARIABLE
110 PM$ = "#####.###" : REM SET MASK
120 GOSUB 50000 : REM CALL
    SUBROUTINE
130 PRINT "THE RESULT IS ";PR$
```

In an edit mask, the symbol # stands for a digit. The example mask shows five digits, then the decimal point, then three more digits. If you run the above program with X equal to 123.4, the resulting string, PR$, will contain 123.400 with two blank spaces to the left of the first digit.

Notice that there are two blanks at the beginning of the result, since the input value (123.4) has only three digits to the left of the decimal, whereas the mask specifies five before the decimal.

Also notice that the edit subroutine pads the right of the decimal with zeros. If there are more digits to the right of the decimal than are provided in the mask, the result is rounded. If there are more digits to the left than are provided in the mask, an error occurs. In case of an error, the result will contain question marks in place of the number that is too big, and the subroutine variable PE will be set to −1 so the program can check for an error. (If no error occurs, PE is set to 0.)

Below are some examples. The PN column shows the input value, while the PM$ column shows the mask. The PR$ column shows what the result will be after invoking the subroutine with the given PN and PM$ values.

PN	PM$	PR$
1.23	#####.###	" 1.230"
123.4578	#####.###	" 123.458"
0.235	#####.###	" 0.235"
12345	#####.###	"12345.000"
123456	#####.###	"?????.###"

In all of the examples above, padding on the left, if necessary, is done with blanks. This is the default, but you can specify a different pad character in the mask. You do this by putting the special character ">" in the mask and following it immediately with the character you want to use for padding. Here are some examples:

PN	PM$	PR$
1.23	>*####.##	"***1.23"
12.4578	>0####.##	"0012.46"
0.235	>-####.##	"---0.24"
1234	>*####.##	"1234.00"

Notice that in the last example above, a pad character of "*" is specified, but the result doesn't show any asterisks. This is because the input value fits the mask perfectly and no padding is necessary.

If you specify a dollar sign ("$") as the pad character, it is handled in a special way. The dollar sign will "float" to the position right before the number portion of the result, and the left will be padded with blanks. Here are some examples:

PN	PM$	PR$
1.23	>$####.##	" $1.23"
12.4578	>$####.##	" $12.46"
0.235	>$####.##	" $0.24"
1234	>$####.##	"1234.00"

Again, in the last example, notice that the input value fits the mask perfectly, and the pad character ("$") does not appear in the result.

There are a few other things you should know about masks. When a mask does not specify a decimal point, the value of PN will be rounded to the nearest whole number in the resulting PR$. A numeric variable with more than nine digits to the left of the decimal is so large that Basic stores it in scientific notation, and it can't be edited by the subroutine.

Finally, you may include other miscellaneous characters in the mask. If they appear before or after the part of the mask that describes how the number will look (the part made up of #s), they are simply copied into the output string. Inside the numeric part of the mask (left of the decimal), they are included as part of the output value or are replaced by the pad character. Study the examples below.

PN	PM$	PR$
−27.7823	>0######	"−00028"
−27.7823	>*######	"***−28"
0.7823	#.#####	"0.78230"
1234.56	$>*###,###.##	"$**1,234.56"
4.56	$>*###,###.##	"$******4.56"
4.56	DM >0###.##	"DM 004.56"
421879966	###-##-####	"421-87-9966"
60983	>0##/##/##	"06/09/83"

In the accompanying program listing, lines 5–60 are a short "driver" program, provided so that you can try out the subroutine.

The subroutine itself begins at line 50000 and has been carefully written so that all the variables it uses have two-character names, all starting with the letter P. As long as you avoid variable names of this form, you can use the subroutine without worrying about inadvertently affecting your other program variables. Have fun!

Digit Fidget and the C-128

Although Digit Fidget will work fine on the C-128, Basic 7.0 offers the Print Using command to make formatting numbers very easy. The entire Digit Fidget subroutine can be replaced by only one line! However, the syntax (or structure) of the format string is a bit different. Let's first look at how you set up the command in Basic 7.0. (See pp. 280–283 of the system guide if you have a C-128.)

The syntax is:

```
PRINT USING "format string";list
```

The format string is the string used to form the result. You must use quotation marks (or a string variable) for the format string. A semicolon then separates the format section from the list of items to print. If more than

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PUDEF	FORMAT STRING	NUMBER	RESULT
"0"	"######"	-27.7823	"000-28"
"*"	"######"	-27.7823	"***-28"
" "	"#.#####"	.7823	"0.78230"
"*"	"$###,###.##"	1234.56	"$**1,234.56"
"*"	"$###,###.##"	4.56	"$******4.56"
"0"	"DM ###.##"	4.56	"DM 004.56"
" -"	"###,##,####"	421879966	"421-87-9966"
"0/"	"##,##,##"	60983	"06/09/83"

Table 1. *The last set of Digit Fidget numbers in Basic 7.0 format.*

one item is in the list, separate them with commas.

Here are some examples:

```
PRINT USING "####";123
PRINT USING X$;12.5
? USING "###.##";A,B,C
```

Notice that the last example uses the question mark to abbreviate the word PRINT—this works fine and is the general syntax. Now let's look at each of the format characters that make up the format field.

The following symbols are used in Basic 7.0 format strings:

Used for one digit in field.
+ Used to force a sign (+ or −) in the field.
− This will force a leading space or minus sign in the field.
. Used to position the decimal point.
, Used to add commas (9,153).
$ Used for a floating dollar sign.
↑↑↑↑ Used to force scientific notation.
= Used to center a string within a field.
> Used to right-justify a string in a field.

The # character defines the width of a field. For example,

```
PRINT USING "####";123
```

would print the string " 123" (without the quotation marks). If more digits than # characters are used, no numbers will appear, since they would exceed the width of the field. Instead, asterisks will replace the number signs (in this example, ****). Remember that the field width determines the maximum width for *all* characters (digits and others).

You may use the + or − sign anywhere in the format string. Doing so forces that sign to be added to the number. This sign will *not* float within the number. The position of the sign in the format string is where it will appear in the final number. Here are some examples (with the result printed to the right to save space):

```
? USING "-###";15          -15
? USING "+####";11.2       +11
```

The "." character just reserves a place for the decimal point. A syntax error will result if more than one decimal point is included in a format string.

The comma character can be used to print numbers in easy-to-read form. For example,

```
? USING "##,###.##";12596.745
```

would print 12,596.75, with the comma inserted as shown in the format field.

The dollar sign floats if used within the format field. It will be placed before the first digit. A bug in the Print Using command will cause a leading comma to be printed if the floating dollar is used. For example,

```
PRINT USING "#$#,###";999
```

prints $,999. A dollar sign placed before the first # will print the $ where it is shown in the format field; thus,

```
PRINT USING "Total = $#,###";999
```

will print Total = $ 999.

The four up-arrow symbols will force the result to be printed in scientific notation. Use enough # characters to get the number of digits you want. For example,

```
PRINT USING "###↑↑↑↑";123456
```

would print 123E+03.

To change the default characters of filler (space), comma, decimal point or dollar sign, use the Basic 7.0 keyword PUDEF. Simply insert in the proper position the new character you want to use. If you want to print a minus sign instead of the comma, type PUDEF" -". You must fill all character positions up to the one you wish to change (here, the space *must* be included). If you want to print the British pound instead of the dollar sign, type PUDEF" ,.£". Any changes you make with PUDEF will remain until another PUDEF change is made.

See Table 1 for the last set of Digit Fidget numbers in Basic 7.0 format. (Use the PUDEF, if required, before the Print Using command.)

You should note that if you redefine characters with PUDEF, you must use the original format character—that is, a pound, comma, period or dollar sign. If these are outside the #s, they will not be replaced. (In that case, they are text, so you can print exactly what you want.)

You now have a format subroutine for the C-64 and a powerful keyword for the C-128. Enjoy them in your programs. R

Address C-64 questions to Michael Broussard, 13136 Lazy Glen Court, Herndon, VA 22071; address C-128 questions to Jim Borden, Borden Software, 641 Adams Road, Carlisle, PA 17013.

Listing 1. *Number formatting program for the C-64 or C-128.*

```
5 PRINT"{SHFT CLR}":PRINT:PRINT"TYPE 'END'
  INSTEAD OF A MASK TO END"          :REM*197
7 PRINT"PROGRAM."                    :REM*229
10 PRINT:PRINT"SURROUND MASK WITH QUOTES IF
   IT"                               :REM*22
15 PRINT"CONTAINS COMMAS.":PRINT:PRINT
                                     :REM*7
20 INPUT"INPUT MASK";PM$:IFPM$="END"THEN EN
   D                                 :REM*150
25 INPUT "VALUE TO BE EDITED";PN     :REM*15
30 GOSUB50000                        :REM*44
35 REM CHECK FOR ERROR FROM SUBROUTINE
                                     :REM*49
40 IFPE THEN PRINT "ERROR!"          :REM*24
60 PRINT"RESULT: ";CHR$(34);PR$;CHR$(34);".
   ":GOTO20                          :REM*242
49997 REM                            :REM*78
49998 REM----------------------------
                                     :REM*19
49999 REM NUMBER FORMATTING SUBROUTINE
                                     :REM*64
```

Listing 1 continued.

```
5ØØØØ PL=LEN(PM$):PE=Ø:PR$="":PC=Ø:PP$=" ":
      PF=Ø:PI=1:PS=Ø:PX=PN              :REM*55
5ØØØ5 PL$="":IF PX<ØTHENPS=1:PX=ABS(PX)
                                        :REM*118
5ØØ1Ø IF PI>PLTHENRETURN                :REM*151
5ØØ15 PT$=MID$(PM$,PI,1):IFPT$<>"#"THEN5Ø14
      Ø                                 :REM*14
5ØØ17 IFPI>1ANDPF=ØTHENIFMID$(PM$,PI-1,1)="
      ."THENPF=PF+1                     :REM*1ØØ
5ØØ2Ø PL$=PL$+PT$:PI=PI+1:IFPT$="#"THENPC=P
      C+1                               :REM*71
5ØØ25 IF PI>PL THEN5ØØ35                :REM*14
5ØØ3Ø PT$=MID$(PM$,PI,1):IF (PT$<>"."ANDPF=
      Ø)OR PT$="#" THEN 5ØØ2Ø           :REM*1
5ØØ35 PF=PF+1:IFPF>1THEN5Ø12Ø           :REM*2ØØ
5ØØ4Ø IFPI<=PLTHENIFMID$(PM$,PI,1)="."THEN5
      ØØ45                              :REM*147
5ØØ42 PX=PX+.5:PF=2                     :REM*43
5ØØ45 PT$=STR$(INT(PX)):PT$=MID$(PT$,2)
                                        :REM*3Ø
5ØØ5Ø P1=LEN(PT$)+PS:IFPC>=P1 THEN5ØØ6Ø
                                        :REM*13
5ØØ55 PE=-1:PT$="??????????????????????":PF
      =2:PI=PI-1                        :REM*13Ø
5ØØ6Ø PK=LEN(PL$):PJ=LEN(PT$)           :REM*119
5ØØ65 IF MID$(PL$,PK,1)<>"#"THEN5ØØ8Ø
                                        :REM*196
5ØØ7Ø PL$=LEFT$(PL$,PK-1)+MID$(PT$,PJ,1)+MI
      D$(PL$,PK+1):PJ=PJ-1              :REM*159
5ØØ75 IFPJ=ØTHEN5ØØ82                   :REM*36
5ØØ8Ø PK=PK-1:IFPK>ØTHEN5ØØ65           :REM*89
5ØØ82 IF PSANDPE=ØANDPP$<>"Ø"THENPL$=LEFT$(
      PL$,PK-2)+"-"+MID$(PL$,PK):PK=PK-1
                                        :REM*75
5ØØ85 IFPP$="$"ANDPK>1THENPL$=LEFT$(PL$,PK-
      2)+"$"+MID$(PL$,PK):PP$=" ":PK=PK-1
                                        :REM*48
5ØØ9Ø IFPP$<>"Ø"ORPK<2THEN5Ø11Ø         :REM*231
5ØØ95 FORPJ=1TOPK:PT$=MID$(PL$,PJ,1):IFPT$=
      "#"THENPT$=PP$                    :REM*172
5ØØ97 IFPSANDPP$="Ø"THENPT$="-":PS=Ø:REM*42
5Ø1Ø5 PL$=LEFT$(PL$,PJ-1)+PT$+MID$(PL$,PJ+1
      ):NEXT:PK=Ø                       :REM*134
5Ø11Ø IFPK>1THENPL$=MID$(PL$,PK):FORPJ=1TOP
      K-1:PL$=PP$+PL$:NEXT              :REM*87
5Ø115 PR$=PR$+PL$:GOTO5Ø135             :REM*22Ø
5Ø12Ø PT=PX-INT(PX):PT=INT(PT*1Ø{UP ARROW}P
      C+.5):PT$=MID$(STR$(PT),2)        :REM*51
5Ø125 P1=PC-LEN(PT$):IFP1>ØTHENFORP2=1TOP1:
      PT$="Ø"+PT$:NEXT                  :REM*1Ø8
5Ø13Ø PR$=PR$+PT$                       :REM*223
5Ø135 PT$=MID$(PM$,PI,1):PC=Ø           :REM*184
5Ø14Ø IFPT$<>">"THEN5Ø15Ø               :REM*177
5Ø145 PI=PI+1:IFPI<=PLTHENPP$=MID$(PM$,PI,1
      ):GOTO5Ø155                       :REM*48
5Ø15Ø IFPE=ØTHENPR$=PR$+PT$             :REM*53
5Ø155 PI=PI+1:IFPF>1THENPR$=PR$+MID$(PM$,PI
      ):RETURN                          :REM*16
5Ø16Ø GOTO5ØØ1Ø                         :REM*241
```


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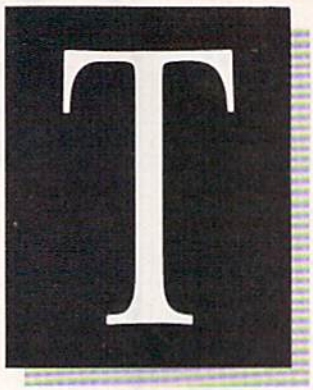

By ROBERT SIMS

Telecomputing Workshop is a monthly column directed to the needs of RUN *readers who are using, or intend to use, their Commodore computer for telecommunications. This month, we'll cover a wide range of topics, including Runterm Plus, the 1660 and downloading.*

I have some experience with machine language programming and I would like to make some changes to Runterm Plus, such as adding an automatic dialing routine and increasing the size of the capture buffer. Would you give me some hints on how I can modify the program? (I have the Supermon machine language monitor.) Also, can I get the source code to look at?

Carl Williams
Stamps, AR

First, for novices, a machine language monitor like Supermon is a program that allows you to load a machine language program, so you can look at the hexadecimal code and make changes directly to it. An assembler, on the other hand, translates assembly language mnemonics, or source code, into machine code.

Using a monitor to modify a machine language program is almost an impossible mission. All programs reserve certain areas of memory to contain variables, buffers, and so on. It's very difficult to tell, just by looking at the machine code, where these areas are; therefore, it's easy to mess up the program by locating your new code in a reserved area. Also, adding even a single byte into the middle of the code can cause all the following commands to address the wrong areas of memory. If that happens, you have a real mess.

To modify a program without going insane, your best bet is to obtain the source code, make your changes, then reassemble the entire program.

Runterm Plus was assembled using several dozen routines that I have written over the past three years. I have arranged with the QuantumLink network to put that source code, along with source code for my bulletin board systems, into the Telecommunications databases in the Commodore Information Network.

The source files containing terminal routines begin with BOZT; the bulletin board files begin with BOZB. Feel free to download these source files and use them for reference to modify Runterm Plus or to build your own terminal program or bulletin board system.

I noticed in your April column that you referred to "old" and "new" versions of the Commodore 1660 modem. How do I tell which version I have, and what's the difference between the two?

William Deavors
Colorado Springs, CO

There are two ways to tell which version you have. First, if the manual includes a section describing how to change the modem's circuits for a C-64, then you have the new version. Also, you can look at the modem itself. Turn your 1660 over and look at the back, where it plugs into the computer. If you see a small section of exposed circuit board (about ⅛ inch), then you have the new version.

The main difference between the two versions is that the new one allows a programmer to detect a carrier signal directly from location 56577 in memory, and the old version does not. Also, the new version has improved circuitry that makes the modem completely compatible with the C-64.

If you have an old version of the 1660 and want to upgrade it, you should take it to your local Commodore service center—check with Commodore customer service in West Chester, Pennsylvania, for the nearest service center.

I have owned a modem for three months now, using it mostly to call bulletin boards in my area. Recently, I heard about Viewtron from a friend and tried to log on using the terminal program that came with my modem. Is there some reason why a terminal program will work with bulletin boards, but not work with a national network?

Ann Miller
Pontiac, MI

Basically, there are two types of online services: those that work with generic terminal programs and those that require a special, or *dedicated* program.

The first type of service includes most local bulletin boards and networks such as CompuServe, The Source and Delphi. These services will

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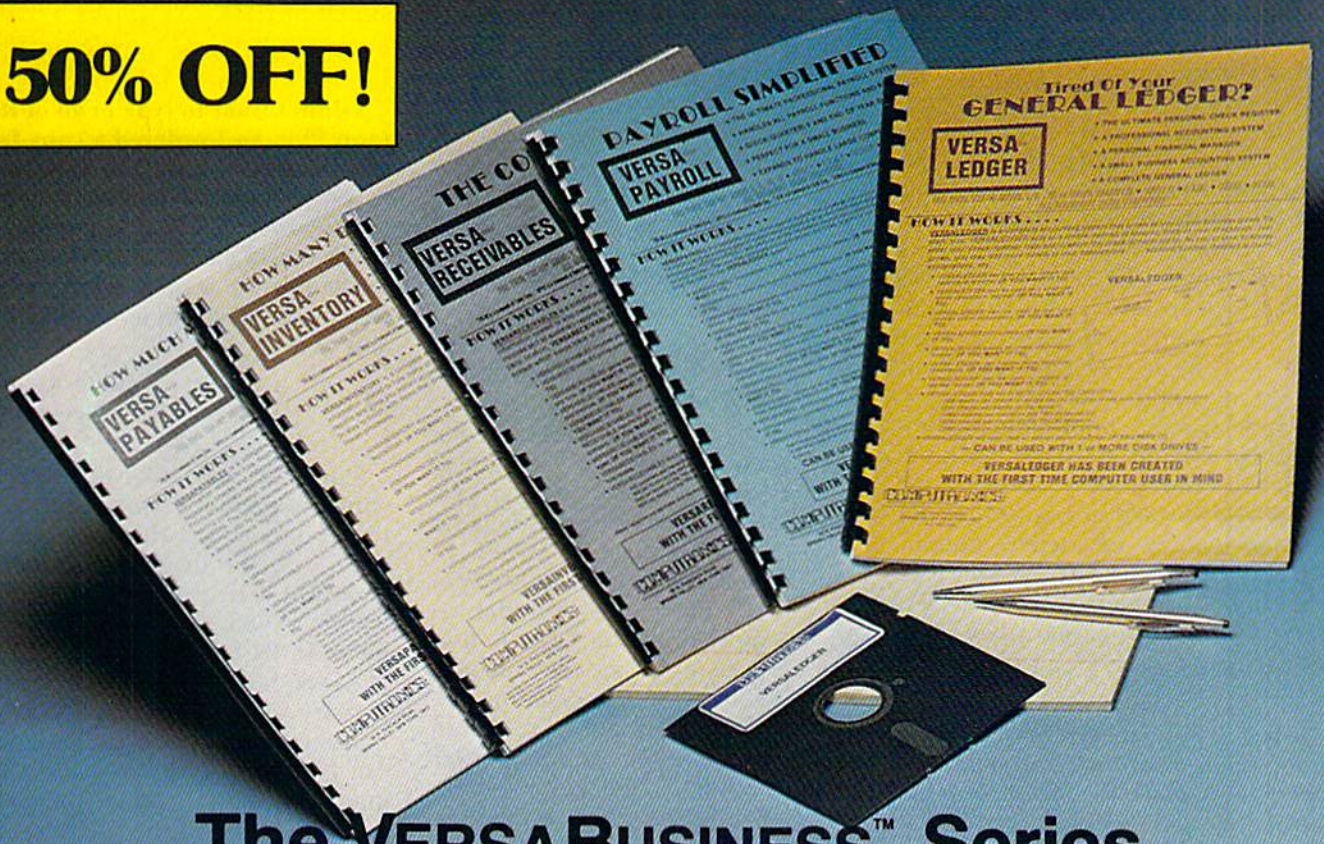

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communicate with any terminal program that uses standard ASCII.

Viewtron, along with Quantum-Link, PlayNet, and bulletin boards using Punter protocols, belong in the second category of services. To access these, you must use a special terminal program supplied by the service.

The reason for this difference is that CompuServe and other services of the first type essentially treat all computer brands alike, sending them all the same codes. But Viewtron and others of the second type send special signals, which are specific for each computer or involve non-standard codes that a generic terminal program would not understand.

These special codes allow the integrated systems to send machine-specific color and graphics, and otherwise to take advantage of the unique features of each computer. All services of the second type provide their customers with the necessary terminal programs when they subscribe.

After typing in Runterm Plus in nine separate sittings, I used a copy program to move the incomplete file to another disk and used my original copy as a backup. I ran the program between sessions, but I just got some garbage on the screen; then the screen cleared, displaying the Ready prompt and the blinking cursor. Is there a bug in the program?

Hironobu Ozaki
East Lansing, MI

It's not a good idea to copy an incomplete file with any program other than ML Perfect Typist, since the copy program may change the file in some unpredictable way.

A better method would be to use ML Perfect Typist to load the incomplete file from one disk, then use Perfect Typist again to save it as an incomplete file to another disk. You will get the effect you describe if the computer tries to execute a zero byte (Break command), which tells it to clear the screen and display the Ready prompt.

Your problem has to do with the fact that Runterm Plus does not load like a Basic program. What probably happened is that during your copy process, the program was loaded into the start-of-Basic memory (location 2049) with

```
LOAD"RUNTERM PLUS",8
```

instead of

```
LOAD"RUNTERM PLUS",8,1
```

which will load the program into memory starting at location 2594, where the program must begin if it is to work properly.

What is a capture buffer and how does it work?

William Jefferson
San Francisco, CA

First, a buffer is any block of computer memory in which data is temporarily stored. Most terminal programs have a capture buffer, ranging from 3000 up to 40,000 bytes, in which you can store data as it comes in over the modem. This buffer remains empty until you open it, usually by pressing a key combination described in the documentation.

Incoming information is stored until you close the capture buffer (with another special key combination) and direct the terminal program to save the buffered information to disk, again by pressing a special key combination.

Most people use capture buffers to save information that otherwise would be lost as soon as you read it, such as conference conversations or bulletin board messages. After the on-line session is over, you have a permanent record that you can refer to at your leisure.

I am using a Total Telecommunications (Telelearning) package. The supplied terminal program dials from the keyboard; before dialing, it opens the phone line. How do I use your program with my modem to open the phone line?

Manh Huu Vu
Hamilton, Ontario
Canada

Runterm Plus doesn't have an automatic dialing routine, so you must use the telephone to dial the number. The procedure is to load and run the program with the Data/Voice switch set to Voice. Then dial the number you want. When you hear the other computer's carrier signal, move the switch to Data.

I didn't want to type in all of Runterm Plus, so I ordered a copy from you. However, I am not able to tell if you sent me the complete code or only Part 1. I am not getting the selections of different services as described in the article. What I'm getting is the copyright notice with your address.

Weldon Amerine
Newton, CT

The disk you received from me contains the full machine code. Since the program was divided into two parts, and the first part did not include the file transfer and network features, you don't see the main menu in Part 1.

At the beginning of Part 2 in the January issue, there are a series of Pokes that set up the program so it can be loaded just like a Basic program. The last Poke in this series activates Part 2 of the program. You must enter this last Poke in order to see the main menu and to use all the features of the program, whether you typed in the program or received a disk copy from me.

I am new to telecommunications and am learning a lot from your column. However, I don't really understand what downloading is or how to do it. I talked to some guys at my user's group, and they said programs have to be translated before you send them and then translated back before you can use them. Can you explain?

Jack Slovik
Pittsburgh, PA

Downloading is the process of having a remote computer transmit to your computer's disk drive a file containing either text or a program. Uploading is the opposite. Unfortunately, it's not a straightforward process.

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5-86

What you described as translating and retranslating files is sort of outdated; things aren't that primitive anymore. In the early days of telecomputing, the technology was concerned only with sending text—the characters you see on a regular typewriter. These characters were represented by numeric codes, and any code that didn't represent a character was used as a control code, to format the data flow between computers.

Program commands, too, were numeric codes to the computer, and some of those program codes were the same as the formatting codes that computers used to transfer files.

This meant that before you could transmit a program through the modem, it had to be converted into character codes so the computer wouldn't confuse program commands with formatting codes. The person receiving the program would then have to retranslate it back into program codes before he could use it.

Programmers were understandably dissatisfied with all this data manipulation, and several procedures were developed to simplify and automate file transfers. Because each individual solves problems in a different way, we now have several transfer protocols that do more or less the same thing.

On some systems, such as CompuServe, you have a choice of several protocols. The system will let you choose the type of download, and you choose the one that's compatible with your terminal program. Look at your terminal program documentation to see which transfer protocol it uses.

If the remote system uses dedicated terminal software, as do Quantum-Link and Viewtron, then you don't have to concern yourself with protocols; the system takes care of all that.

In any case, when you download a file, you should be sure that your disk has enough room to store the complete file that you're about to receive. Also, you should store the file using a filename that isn't already used on the disk. The download process will automatically take the file from the remote computer and store it on your disk, ready to use.

The best way to become proficient at downloading is to study the documentation for your favorite network or bulletin board and try it repeatedly on short files from the download databases. Initially, you may want to use empty disks, so you won't corrupt any useful files if something disastrous happens.

And if you can't figure out the download method for one network or bulletin board, try other systems. The number of on-line services is growing rapidly, and quality and ease of use vary widely. Shop around. R

Address all correspondence regarding this column to: Robert Sims, Telecomputing Workshop, c/o RUN *Magazine, 80 Pine St., Peterborough, NH 03458.*

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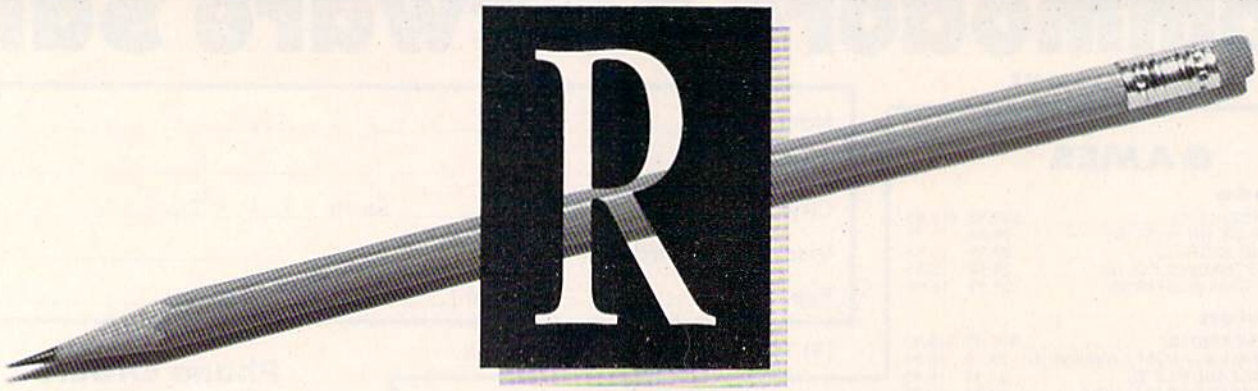

By MARGARET MORABITO

Educators are now bringing computers into fine arts departments. See how one college and one middle school are using C-64s in music courses and for administrative work.

In the 1970s, educators used the microcomputer primarily for teaching technically oriented computer science and engineering courses. Since then, the use of the microcomputer in education has broadened to the point where its impact is now felt in a wide range of non-technical areas.

Most microcomputers have features that make them useful in a variety of subjects, such as language arts, social studies, mathematics, history and foreign language study, to name a few. As long as the computer can handle text displays and some graphics, it can adequately handle software created for many of these courses.

In certain subjects, software requirements are more demanding. Educators in the creative and fine arts, for example, are gradually realizing the computer's potential to create graphics design and to produce sound. Music instruction, in particular, is an area in which computers are becoming more active.

From simple sound recognition to multi-voiced composition, the music curriculum demands special features from a computer, such as the ability to produce monophonic and polyphonic sounds, to handle high-resolution graphics and to operate attached MIDI instruments. Teachers are discovering that the C-64 is effectively designed to fill these requirements for music department course work.

The C-64 has a built-in sound synthesizer (the SID chip), which is capable of producing multi-voiced sounds, with up to three voices simultaneously. For large-scale sound output, you may attach external amplifiers and speakers to this computer, or you can use the speaker built into your video monitor. The C-64 also handles high- and low-resolution color graphics.

Furthermore, if you want to attach MIDI instruments to your C-64, for the study and production of more intricate musical arrangements and electronic sound, you may do so by purchasing a MIDI interface. Due to their low price, the built-in sound and graphics capabilities and the wealth of music software available for them, the C-64 and the C-128 are logical choices for computer-assisted instruction in music.

College Music Department

For the music department of Augustana College, in Sioux Falls, South Dakota, the C-64 has become a sound and multifaceted investment. It is used for music instruction in those courses that currently rely on drill and practice, and it has been a time-saver with administrative chores.

Two years ago, when the college created computer labs in each of its classroom buildings, Professor Walter May, Chairman of the Music Department, began to get familiar with the C-64. At that time, May knew nothing about computers nor how they could help him in his work, but, through the encouragement of the college administration and guidance from his son at home, he began to learn how to use the 64.

Says May, "I began to realize how useful it would be, not only for computer-assisted music instruction, but also in my administrative role as department chairman."

C-64 in the Music Curriculum

May uses C-64s in a music laboratory for his music fundamentals courses. At the beginning of the semester, he introduces the C-64 to his class, demonstrating how to use the system and its software. From then on, students use the music lab for regular assignments and practice.

The computer is specifically used for teaching the major and minor scales, all the major and minor key signatures, all the intervals and their inversions, and four types of triads and their inversions. It is also used for ear-training in general.

The computer "saves a lot of class time that used to be taken up with this kind of drill," relates May. "Now the students can do this on their own time and as often as they wish." Furthermore, the students enjoy the interaction with the computers. May has been able to document students' progress from drill to drill and claims that this computer-assisted instruction is effective.

The Software Involved

The music fundamentals class is for beginning music students who are

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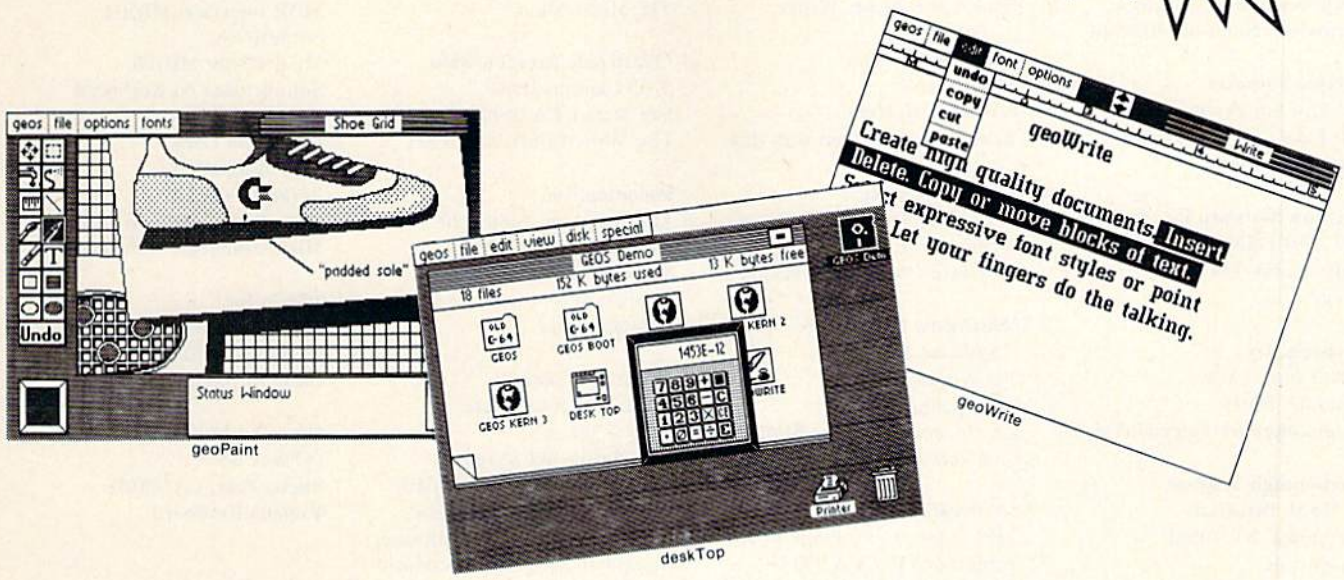

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There's also a few desk accessories, for that little extra help when and where you need it. Available from any **GEOS** application, they include an alarm clock, a notepad, a four function calculator, and photo and text albums (for collecting pictures and phrases to paste into other applications).

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Table 1. *List of music software, keyboards and MIDI equipment for the C-64. Asterisks indicate the manufacturers of products mentioned in this column.*

considering becoming music majors, but who never received training in the rudiments of music prior to attending college. This training uses several software packages published by MECC (Minnesota Educational Computing Consortium): Pitch, Scales and Chords, Terms and Notation, and Rhythm. The goal is to remedy students' deficiencies in basic music concepts, so that they can enter the regular theory course sequence with others who have had previous training.

The Pitch program is used because it offers useful drills for learning to recognize intervals and conceptualize pitches. There are four modules in this program, and it's used more than the other three from MECC because of its slant toward college-level students. The other programs are used only in select cases, as they're intended for more elementary-level students.

May also relies on software from Electronic Courseware Systems, Inc. He has purchased four programs from this firm: Ear Challenger, a game involving tonal memory; Music Room, a tuning exercise involving the matching of pitches; Clef Notes, a drill program for learning the alto and tenor clefs; and Listen, a review of intervals, triads and seventh chords.

He uses Clef Notes in his advanced theory class, which requires the writing of musical scores using treble, alto, tenor and bass clefs. The other programs are used in the music fundamentals course.

For those classes requiring a lot of factual knowledge of the music associated with particular composers, styles, periods and countries, May creates his own study materials. He uses Commodore's Easy Quiz and Easy Lessons to make multiple-choice study aids, which are used by students as they review for tests.

Additional Uses of the C-64

For May, the C-64's value goes beyond the music lab. To keep track of students' grades in each course, May uses a program called Master Grades, from Midwest Software. He's able to keep one year's grades on a single disk, providing a quick determination of current grade averages and a printed summary of grades at any time.

One of his most valued applications is Spinnaker Software's Better Working Spreadsheet, which keeps the current and comprehensive student records that he needs for his duties as academic advisor. He sets up the spreadsheet so that he can easily show a student his or her current status in the degree program and demonstrate the effect of improved performance in certain areas. At the end of an advising session, he gives each student a printout of his or her record.

May also uses Midwest Software's The Bottom Line to handle several large budgets. Business correspondence is done with Easy Script and a Silver Reed letter-quality printer. When planning trips for the college, May uses a program called Roadsearch Plus (Columbia Software) to pin down the details of the trip.

Meeting the needs of both music in-

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Photo 1. Eighth grade students at LaVenture Middle School explore the world of electronic music through the C-64.

struction and administrative tasks, the C-64 helps in all areas of Professor May's work.

Middle School Music Project

The LaVenture Middle School in Mount Vernon, Washington, is also using C-64s in its music department, but with a slightly different focus: electronic music. The school has a long history of music education and has taught a unit on electronic music for 15 years. Harry Weldon, the Music Coordinator and a 25-year veteran music teacher, is currently piloting a new project involving music and computers with the eighth-grade students.

Weldon feels that the computer can be integrated into the entire music curriculum. He has found it well-suited for teaching basic music skills, composition, pitch recognition and ear training, as well as for drill and practice.

The goal of the school's music program is to broaden the students' perspective to include a knowledge of many different areas of music. "Electronic music provides an excellent way to do this," states Weldon. "Computers are 'in' with the students, and they have an eager interest to see how they may be used."

Weldon uses a wide range of music software in combination with traditional tools, such as tape recorders and audio-visual aids, to spark the interest of his students and to lead them from the basics through more advanced electronic music concepts.

An Overview of Weldon's Course

Weldon begins the course by introducing his students to the sounds of electronic music. They listen to and analyze the Electric Light Parade, from Walt Disney Productions, as well as Dripsody. Out of this experience, he makes the point that the composer of electronic music can use the computer to do his work more easily and rapidly.

To develop basic concepts about sound and music, the class first experiments with a variety of sounds and noises produced by tuning forks and instruments, and then with electronically produced sounds. A program called 3001: A Sound Odyssey, from Sight and Sound, provides the students with an introduction to the concepts of electronic music, as well as tutorials and hands-on sessions for studying each of the properties of sound: pitch, duration, volume and tone color. Another program used for this is the Commodore 64 Tutorial, Volume 2, from Cyberia, Inc.

In the beginning, all of the course work is done in class using one computer and multiple screens. According to Weldon, "The RF output of the C-64 makes this very easy to set up." Only after the students have a good working background of music concepts and the computer do they move into the school's electronic music lab.

As the course proceeds, the class learns about synthesizers and their capabilities. This is where the computer is used extensively for hands-on training. The class uses Music Port (Tech Sketch), The Incredible Musical Keyboard (Sight and Sound) and both the Yamaha and Casio keyboards.

Eventually, students are introduced to composition programs including 3001 and Kawasaki Synthesizer (Sight and Sound), The Music Construction Set (Electronic Arts), Master Composer (Access Software), Bank Street Music Writer (Mindscape) and The Music Studio (Activision).

The success of the school's electronic music program is due partly to the popularity of the C-64 and C-128. Most students have these computers at home and thus can easily follow up on their classwork. They can also contribute to the school's lab by bringing in their own joysticks and other peripherals. Although this school could choose from a variety of computers, it chose the C-64 to begin the project, partly because so many students were already familiar with the C-64 but mainly, as Weldon says, "because of the outstanding features of the SID chip."

Thank You

Walter May and Harry Weldon are taking important steps by introducing computers into their courses. Their experiences can provide a clearer path for others who want to learn more about how to integrate

the computer into the areas of music instruction and administrative work. I'd like to thank both of these educators for so readily contributing their experiences and time to this installment of The Resource Center.

I welcome responses from those of you who are using C-64s, VIC-20s or C-128s for educational purposes.

Tips from Teachers

In response to the February Resource Center on networking, some educators wrote offering tips about how to overcome lockup problems when employing multiuser switches.

L. Benado, of Russell Sage Junior High School in Forest Hills, NY, writes, "The problem of lockup is a major one. All too often a student will lose many hours of work because his program will not save. Many times two students' programs become intermixed, and the saved program is worthless. We knew this was a problem we had to live with, but that didn't make the student feel any better when it happened. Lockup could happen at any time, not just when more than one computer was accessing a peripheral simultaneously. A solution that sometimes works is to disconnect the power cord from the VIC Switch and then reconnect it."

Curt Cardine, from the Winchester Elementary School in Winchester, NH, offered this advice: "*RUN*'s 1985 Special Issue published a Magic trick that works extremely well with a networking error. By typing

```
POKE 144,0
```

and pressing the return key, most Device Not Present errors can be cleared up. Sometimes the students have to enter this Poke number twice before it works, but it usually works well. Another trick is to turn the printer off and on again; this resets the switch." R

If you are using Commodore computers for educational purposes (at home or in school) and would like to share your experiences through The Resource Center, write me a letter detailing the equipment you're using, the subject areas you're involved in, the grade level or age of your students, software that has been effective and any other information you feel like including. Send letters to:

Margaret Morabito
c/o The Resource Center
RUN *Editorial*
80 Pine St.
Peterborough, NH 03458

You can also leave messages in my on-line mail boxes: CompuServe (70616,714); Delphi (MARGM); and QuantumLink (MARGM).

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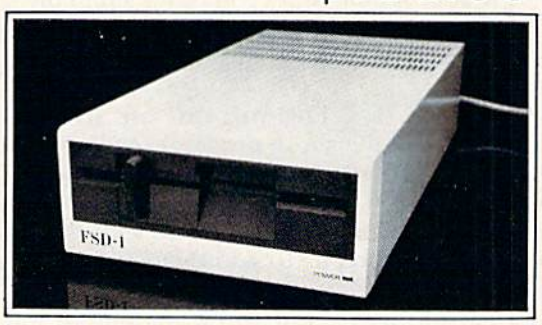

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From p. 10.

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Elaine Buckshaw
Holbrook, NY

$2E9 Line-editing tips—When changing Basic program lines, here are some things to keep in mind.

1. As long as the cursor is on the altered line when you press the return key, the line will be entered into the program. You needn't move the cursor to the end of the line.

2. You can duplicate a line in the program by listing it, typing a new line number over the old one, then pressing return. The new line number will be added to the program, and the old one will remain as it was.

3. Before you press the return key, you can easily discard your changes by pressing shifted return or by moving the cursor off the line in question. The line will remain in memory in its uncorrected state.

4. If you want to replace one line with another while retaining the option of restoring the original line, insert a REM statement in the original line, just after its number. Then give the replacement a line number that is a small offset of the original. You can later undo your work by removing the REM and deleting the second line.

5. If you want to move a group of lines from one program to another, load the first program and list the lines you want to move on the screen. Then, without disrupting the screen, load the second program, move the cursor to each of the listed lines and press the return key. The first program's lines will be added to the second program. If the line numbers interfere with those in the second program, you can change them before pressing the return key.

6. If you have a C-128, you can use its two-screen capability to make the above process even better. List the desired lines to the 80-column screen, then use ESC X to return to 40-column mode. The lines will stay on the 80-column screen no matter what you do with the program or the 40-column screen. To add them to your program at any time, use ESC X to move to 80-column mode, then put your cursor on each line you wish to move and press the return key.

J. C. Vollmer
Prior Lake, MN

$2EA Keyboard lock/unlock—Sometimes, usually when garbage has been printed to the screen, the shifted Commodore key won't switch your computer between Text and Graphics modes. (Naturally this always happens when you're in the mode you don't want to be in.)

You can correct the situation by holding down the CTRL key and pressing I. This is equivalent to printing a CHR$(9), the character that unlocks the mode switch. You can lock the mode as well, by pressing CTRL-H, which is the same as printing CHR$(8).

Scott Duncan
Superior, NE

$2EB C-64 screen blanking—When the C-64's screen is blanked, the border color temporarily covers the entire face of the monitor, and processing speed increases slightly. The real screen is still active and can be printed to or Peeked in the normal way. You can even use it for dynamic keyboard activities, and no observer will see what's going on.

To blank the screen, you can enter:

```
POKE 53265,PEEK(53265) AND 239
```

To return it to normal, just enter:

```
POKE 53265,PEEK(53265) OR 16
```

Location 53265 is also used to enable bit map graphics, extended background color mode and several other exotic modes. If your program doesn't use any of them, the Pokes become much simpler. To blank the screen, use:

```
POKE 53265,11
```

To return it to normal, use:

```
POKE 53265,27
```

Since very few programs use the exotic graphics modes, these simpler Pokes will almost always work.

Sue Dohnim
Apenna, ME

$2EC C-64 text-color change—This has been needed for years. It instantaneously changes the color of all text already printed on the screen.

```
50 POKE 648,224 : POKE 53281,A : PRINT " {COLOR A}
   {SHFT CLR} "
60 POKE 648,4 : POKE 53281,B : PRINT " {COLOR C} "
```

A is the Poke value for the color you want the text to become. Color A is that color's corresponding key; B is the Poke value for the screen color you want when the routine is finished; and C is the key for the text color you want active at that time.

The routine works with all known ROM versions and with the C-128 in C-64 mode. It resets the screen line links, which may occasionally cause minor troubles. The overall effect may be more pleasing if you blank the screen while the routine is being executed.

Louis F. Sander
Pittsburgh, PA

$2ED Improving background color changes—Many C-64 programs let you select the background color of your screen. But when you change it to the character color, you cannot see the printed text. This subroutine avoids the problem, taking advantage of the fact that white letters show up well on all colors except white. When the subroutine is called, the background color advances by 1. The cursor color remains white, unless the background is white. In that case, the cursor turns black. When the background changes again, the cursor returns to white.

A demonstration routine is included to illustrate the system. When used in conjunction with the above text color change routine, this subroutine can ensure that preexisting text never becomes invisible.

```
3Ø REM BACKGROUND CHANGE DEMO ROUTINE
4Ø PRINT"PRESS A KEY TO CHANGE COLORS{CRSR
   DN}"
5Ø GETA$:IFA$=""THEN5Ø
6Ø GOSUB11Ø : REM CHANGE BKGD COLOR
7Ø POKE53281,BC:POKE646,CC:PRINT"BKGD";BC,"
   CHAR";CC
8Ø GOTO5Ø
9Ø :
1ØØ REM BACKGROUND CHANGE SUBROUTINE
11Ø BC=PEEK(53281)AND15:CC=PEEK(646)
12Ø BC=(BC+1)AND15:CC=1AND(CC<>BC)
13Ø RETURN
```

Dee Plume
Nome, AK

$2EE Filename extensions—Do you wonder why some people end filenames with a period and three letters? Music filenames, for example, commonly end in .MUS, while files for downloading often have names ending in .IMG, or something similar.

The practice is common in computers using disk operating systems like CP/M and IBM's PC-DOS. Filenames in these operating systems are limited to eight characters, compared to Commodore's 16. In addition to its name, such a file can have an optional "extension" of up to three characters, separated from the filename by a period.

When the operating system lists such a file in a directory, it uses spaces to pad the filename to eight characters, then it prints another space and the extension. When searching for files, it treats the extensions as different from the filenames, so you can, for example, search for all files whose extension is BAS. This feature makes it useful to group similar files by giving them similar extensions, and this is the practice that is sometimes carried over into Commodore work.

But in Commodore's DOS, of course, there's no such thing as a separate extension. You can't search on it, and, because of the 16-character limit for filenames, you don't really need it. In fact, if you want to emulate such an extension, it's best to put it at the *beginning* of the filename, where it can be searched for by using the wild-card characters.

So, if you're tempted to tack a period and three letters onto the end of your filenames, try to resist the temptation. If you *can't* resist it, try putting them up front where you can use them.

Lucy S. Terrier
Alton, IL

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From p. 38.

Listing 1 continued.

```
2Ø49 DATA36,76,Ø,Ø,56,73,255,1Ø5    :REM*1Ø3
2Ø5Ø DATAØ,96,32,246,36,24,165,25Ø :REM*16Ø
2Ø51 DATA1Ø5,8Ø,133,25Ø,144,2,23Ø,251
                                    :REM*1Ø1
2Ø52 DATA96,32,1Ø,37,56,165,25Ø,233 :REM*7Ø
2Ø53 DATA8Ø,133,25Ø,176,2,198,251,96
                                    :REM*241
2Ø54 DATA32,231,36,14,223,49,144,11 :REM*88
2Ø55 DATA46,223,49,165,25Ø,2Ø8,2,198 :REM*1
2Ø56 DATA251,198,25Ø,96,32,216,36,78:REM*96
2Ø57 DATA223,49,144,9,11Ø,223,49,23Ø
                                    :REM*171
2Ø58 DATA25Ø,2Ø8,2,23Ø,251,96,1Ø,7 :REM*12Ø
2Ø59 DATA246,213,1Ø,228,246,243,216,7:REM*5
2Ø6Ø DATA216,213,231,228,231,243,37,37
                                    :REM*184
2Ø61 DATA36,36,37,36,36,36,36,37    :REM*121
2Ø62 DATA36,36,36,36,36,36,Ø        :REM*2Ø8
2Ø7Ø BSAVE"P.ULTRAPLOT",BØ,P9Ø35 TO P9529
                                    :REM*3Ø
3ØØØ FORZ=1416ØTO15228:READY:POKEZ,Y:NEXT
                                    :REM*199
3ØØ1 DATA32,128,3,32,9,136,142,7    :REM*18
3ØØ2 DATA5Ø,32,15,136,165,22,141,81:REM*2Ø5
3ØØ3 DATA59,165,23,141,82,59,32,15  :REM*94
3ØØ4 DATA136,165,22,141,83,59,165,23:REM*29
3ØØ5 DATA141,84,59,32,15,136,165,22 :REM*96
3ØØ6 DATA141,85,59,165,23,141,86,59:REM*123
3ØØ7 DATA32,15,136,165,22,141,87,59:REM*1Ø4
3ØØ8 DATA165,23,141,88,59,162,Ø,142:REM*179
3ØØ9 DATA75,59,142,76,59,142,79,59 :REM*216
3Ø1Ø DATA142,8Ø,59,142,74,59,232,142:REM*23
3Ø11 DATA78,59,169,1Ø4,141,77,59,169
                                    :REM*17Ø
3Ø12 DATA8,141,73,59,32,247,55,2Ø8 :REM*255
3Ø13 DATA82,32,15,136,165,22,141,75 :REM*72
3Ø14 DATA59,165,23,141,76,59,32,247:REM*231
3Ø15 DATA55,2Ø8,64,32,15,136,165,22 :REM*86
3Ø16 DATA141,77,59,165,23,141,78,59 :REM*11
3Ø17 DATA32,247,55,2Ø8,46,32,15,136 :REM*7Ø
3Ø18 DATA165,22,141,79,59,165,23,141
                                    :REM*231
3Ø19 DATA8Ø,59,32,247,55,2Ø8,28,32 :REM*1Ø2
3Ø2Ø DATA15,136,165,22,141,73,59,165:REM*17
3Ø21 DATA23,141,74,59,24,144,12,162:REM*21Ø
3Ø22 DATAØ,169,61,16Ø,Ø,32,116,255 :REM*121
3Ø23 DATA2Ø1,44,96,172,75,59,173,76 :REM*24
3Ø24 DATA59,32,89,59,162,239,16Ø,58:REM*229
3Ø25 DATA32,1Ø2,175,162,224,16Ø,58,32
                                    :REM*196
3Ø26 DATA1Ø2,175,172,77,59,173,78,59
                                    :REM*119
3Ø27 DATA32,89,59,162,244,16Ø,58,32 :REM*14
3Ø28 DATA1Ø2,175,172,73,59,173,74,59
                                    :REM*1Ø1
3Ø29 DATA32,89,59,162,249,16Ø,58,32 :REM*36
3Ø3Ø DATA1Ø2,175,172,79,59,173,8Ø,59:REM*95
3Ø31 DATA32,89,59,162,254,16Ø,58,32 :REM*2Ø
3Ø32 DATA1Ø2,175,169,254,16Ø,58,32,99:REM*5
3Ø33 DATA175,32,63,175,162,3,16Ø,59:REM*2Ø8
3Ø34 DATA32,1Ø2,175,169,254,16Ø,58,32
                                    :REM*237
3Ø35 DATA99,175,32,66,175,162,8,16Ø :REM*52
3Ø36 DATA59,32,1Ø2,175,169,Ø,141,213
                                    :REM*189
3Ø37 DATA58,172,85,59,173,86,59,32  :REM*32
3Ø38 DATA3,175,162,13,16Ø,59,32,1Ø2:REM*121
3Ø39 DATA175,172,87,59,173,88,59,32 :REM*58
3Ø4Ø DATA3,175,162,18,16Ø,59,32,1Ø2:REM*189
3Ø41 DATA175,172,81,59,173,82,59,32 :REM*9Ø
3Ø42 DATA3,175,162,23,16Ø,59,32,1Ø2:REM*157
3Ø43 DATA175,172,83,59,173,84,59,32:REM*254
3Ø44 DATA3,175,162,28,16Ø,59,32,1Ø2:REM*225
3Ø45 DATA175,169,244,16Ø,58,32,93,175
                                    :REM*146
3Ø46 DATA169,239,16Ø,58,32,99,175,32
                                    :REM*183
3Ø47 DATA21,175,32,1Ø8,175,169,249,16Ø
                                    :REM*238
3Ø48 DATA58,32,99,175,32,39,175,32 :REM*173
3Ø49 DATAØ,175,165,1Ø3,73,255,141,222
                                    :REM*3Ø
3Ø5Ø DATA58,165,1Ø2,73,255,141,223,58:REM*9
3Ø51 DATA238,222,58,2Ø8,3,238,223,58:REM*34
3Ø52 DATA169,224,16Ø,58,32,99,175,32
                                    :REM*177
3Ø53 DATA63,175,169,13,16Ø,59,32,93 :REM*88
3Ø54 DATA175,32,33,175,162,33,16Ø,59
                                    :REM*2Ø7
3Ø55 DATA32,1Ø2,175,169,224,16Ø,58,32
                                    :REM*234
3Ø56 DATA99,175,32,66,175,169,18,16Ø:REM*71
3Ø57 DATA59,32,93,175,32,33,175,162:REM*138
3Ø58 DATA38,16Ø,59,32,1Ø2,175,169,38:REM*65
3Ø59 DATA16Ø,59,32,99,175,169,8,16Ø  :REM*2
3Ø6Ø DATA59,32,93,175,32,33,175,162:REM*141
3Ø61 DATA48,16Ø,59,32,1Ø2,175,169,33
                                    :REM*17Ø
3Ø62 DATA16Ø,59,32,99,175,169,3,16Ø  :REM*1
3Ø63 DATA59,32,93,175,32,33,175,162:REM*144
3Ø64 DATA53,16Ø,59,32,1Ø2,175,169,48:REM*23
3Ø65 DATA16Ø,59,32,99,175,169,53,16Ø:REM*62
3Ø66 DATA59,32,93,175,32,21,175,162:REM*1Ø7
3Ø67 DATA43,16Ø,59,32,1Ø2,175,169,33:REM*96
3Ø68 DATA16Ø,59,32,99,175,169,8,16Ø :REM*11
3Ø69 DATA59,32,93,175,32,33,175,162:REM*15Ø
3Ø7Ø DATA48,16Ø,59,32,1Ø2,175,169,38:REM*85
3Ø71 DATA16Ø,59,32,99,175,169,3,16Ø :REM*1Ø
3Ø72 DATA59,32,93,175,32,33,175,169 :REM*1Ø
3Ø73 DATA48,16Ø,59,32,93,175,32,27 :REM*197
3Ø74 DATA175,162,38,16Ø,59,32,1Ø2,175
                                    :REM*174
3Ø75 DATA162,4,189,43,59,157,33,59 :REM*197
3Ø76 DATA2Ø2,16,247,169,23,16Ø,59,32
                                    :REM*2Ø8
3Ø77 DATA99,175,169,33,16Ø,59,32,93:REM*1Ø5
3Ø78 DATA175,32,27,175,162,229,16Ø,58
                                    :REM*76
3Ø79 DATA32,1Ø2,175,169,28,16Ø,59,32:REM*19
3Ø8Ø DATA93,175,169,38,16Ø,59,32,99:REM*238
3Ø81 DATA175,32,21,175,162,234,16Ø,58
                                    :REM*221
3Ø82 DATA32,1Ø2,175,173,213,58,24Ø,74
                                    :REM*48
3Ø83 DATA173,214,58,174,215,58,141,196
                                    :REM*241
3Ø84 DATA49,142,197,49,173,216,58,174
                                    :REM*88
3Ø85 DATA217,58,141,198,49,142,199,49
                                    :REM*221
3Ø86 DATA169,229,16Ø,58,32,99,175,32
                                    :REM*222
3Ø87 DATA116,59,14Ø,2ØØ,49,14Ø,214,58
                                    :REM*245
3Ø88 DATA141,2Ø1,49,141,215,58,169,234
                                    :REM*23Ø
3Ø89 DATA16Ø,58,32,99,175,32,116,59:REM*129
3Ø9Ø DATA14Ø,2Ø2,49,14Ø,216,58,141,2Ø3
                                    :REM*8Ø
3Ø91 DATA49,141,217,58,32,75,35,56  :REM*31
3Ø92 DATA176,47,238,213,58,169,229,16Ø
                                    :REM*28
3Ø93 DATA58,32,99,175,32,116,59,14Ø :REM*89
3Ø94 DATA214,58,14Ø,218,58,141,215,58
                                    :REM*2Ø6
3Ø95 DATA141,219,58,169,234,16Ø,58,32
                                    :REM*179
3Ø96 DATA99,175,32,116,59,14Ø,22Ø,58
                                    :REM*23Ø
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Listing 1 continued.

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3Ø97 DATA14Ø,216,58,141,217,58,141,221
                                        :REM*233
3Ø98 DATA58,173,222,58,2Ø8,3,2Ø6,223
                                        :REM*146
3Ø99 DATA58,2Ø6,222,58,173,222,58,2Ø8
                                        :REM*75
31ØØ DATA5,173,223,58,24Ø,27,169,224
                                        :REM*172
31Ø1 DATA16Ø,58,32,93,175,169,249,16Ø
                                        :REM*1Ø1
31Ø2 DATA58,32,99,175,32,27,175,162:REM*248
31Ø3 DATA224,16Ø,58,32,1Ø2,175,76,232
                                        :REM*19
31Ø4 DATA56,173,75,59,2Ø8,7Ø,173,76:REM*242
31Ø5 DATA59,2Ø8,65,169,1Ø4,77,77,59:REM*215
31Ø6 DATA2Ø8,58,169,1,77,78,59,2Ø8  :REM*24
31Ø7 DATA51,173,214,58,174,215,58,141
                                        :REM*51
31Ø8 DATA196,49,142,197,49,173,216,58
                                        :REM*2ØØ
31Ø9 DATA174,217,58,141,198,49,142,199
                                        :REM*225
311Ø DATA49,173,218,58,174,219,58,141
                                        :REM*24Ø
3111 DATA2ØØ,49,142,2Ø1,49,173,22Ø,58
                                        :REM*13
3112 DATA174,221,58,141,2Ø2,49,142,2Ø3
                                        :REM*16
3113 DATA49,32,75,35,96,Ø,Ø,Ø       :REM*125
3114 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*232
3115 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*233
3116 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*234
3117 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*235
3118 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*236
3119 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*237
312Ø DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*238
3121 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*239
3122 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*24Ø
3123 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*241
3124 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*242
3125 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*243
3126 DATAØ,Ø,131,73,15,218,162,13Ø  :REM*96
3127 DATAØ,Ø,Ø,Ø,128,Ø,Ø,Ø         :REM*147
3128 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø           :REM*246
3129 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø           :REM*247
313Ø DATAØ,32,3,175,32,1Ø8,175,16Ø :REM*178
3131 DATA1Ø4,169,1,32,3,175,32,39  :REM*249
3132 DATA175,169,58,16Ø,59,32,93,175
                                        :REM*246
3133 DATA32,33,175,96,32,Ø,175,164 :REM*197
3134 DATA1Ø3,165,1Ø2,96,Ø            :REM*1Ø
314Ø BSAVE"P.UHCIRCLE",BØ,P1416Ø TO P15228
                                        :REM*188
4ØØØ FORZ=12992TO14158:READY:POKEZ,Y:NEXT
                                        :REM*2Ø7
4ØØ1 DATA32,128,3,32,15,136,165,22 :REM*1Ø6
4ØØ2 DATA141,38,55,165,23,141,39,55:REM*133
4ØØ3 DATA32,9,136,142,37,55,32,9   :REM*2Ø8
4ØØ4 DATA136,142,4Ø,55,32,81,51,2Ø8:REM*169
4ØØ5 DATA66,32,9,136,142,5Ø,55,32  :REM*12Ø
4ØØ6 DATA81,51,2Ø8,6Ø,32,9,136,142 :REM*147
4ØØ7 DATA51,55,32,81,51,2Ø8,62,32  :REM*22Ø
4ØØ8 DATA9,136,142,52,55,32,9,136  :REM*193
4ØØ9 DATA142,53,55,32,81,51,2Ø8,52 :REM*124
4Ø1Ø DATA32,9,136,142,54,55,32,9   :REM*211
4Ø11 DATA136,142,55,55,32,9,136,142:REM*12Ø
4Ø12 DATA56,55,32,9,136,142,57,55  :REM*243
4Ø13 DATA76,93,51,169,255,141,5Ø,55 :REM*98
4Ø14 DATA173,5Ø,55,16Ø,7,153,5Ø,55 :REM*163
4Ø15 DATA136,2Ø8,25Ø,24Ø,4Ø,16Ø,1,162
                                        :REM*196
4Ø16 DATA3,32,7Ø,51,16Ø,3,162,7    :REM*143
4Ø17 DATA32,7Ø,51,76,93,51,185,5Ø  :REM*1Ø2
4Ø18 DATA55,157,5Ø,55,2Ø2,136,16,246
                                        :REM*175
4Ø19 DATA96,162,Ø,169,61,16Ø,Ø,32  :REM*144
4Ø2Ø DATA116,255,2Ø1,44,96,173,Ø,255
                                        :REM*199
4Ø21 DATA41,254,141,Ø,255,169,Ø,141:REM*244
4Ø22 DATA58,55,141,59,55,141,6Ø,55 :REM*149
4Ø23 DATA141,61,55,169,Ø,133,158,169
                                        :REM*122
4Ø24 DATA224,133,159,169,255,133,174,169
                                        :REM*75
4Ø25 DATA253,133,175,32,1Ø8,54,144,1
                                        :REM*132
4Ø26 DATA96,173,37,55,141,62,55,169:REM*249
4Ø27 DATA255,141,63,55,141,64,55,32 :REM*68
4Ø28 DATA166,53,32,195,53,173,38,55:REM*223
4Ø29 DATA2Ø1,127,2Ø8,7,173,39,55,2Ø1
                                        :REM*1Ø8
4Ø3Ø DATA2,24Ø,24,238,38,55,2Ø8,3  :REM*227
4Ø31 DATA238,39,55,32,1Ø8,54,144,229
                                        :REM*166
4Ø32 DATA173,38,55,2Ø8,3,2Ø6,39,55 :REM*121
4Ø33 DATA2Ø6,38,55,169,Ø,141,35,55 :REM*226
4Ø34 DATA141,36,55,173,38,55,32,35  :REM*73
4Ø35 DATA54,173,39,55,32,35,54,173  :REM*82
4Ø36 DATA37,55,24Ø,91,2Ø6,37,55,32   :REM*3
4Ø37 DATA1Ø8,54,176,75,173,35,55,2Ø8
                                        :REM*248
4Ø38 DATA75,173,38,55,32,166,53,173 :REM*37
4Ø39 DATA39,55,32,166,53,173,37,55  :REM*3Ø
4Ø4Ø DATA32,166,53,174,63,55,2Ø2,236:REM*19
4Ø41 DATA37,55,24Ø,26,174,58,55,2Ø8 :REM*32
4Ø42 DATA21,32,85,54,141,45,55,32    :REM*77
4Ø43 DATA85,54,32,195,53,173,45,55  :REM*42
4Ø44 DATA32,195,53,238,58,55,173,63:REM*171
4Ø45 DATA55,141,64,55,173,37,55,141 :REM*58
4Ø46 DATA63,55,238,35,55,2Ø8,5,169 :REM*173
4Ø47 DATAØ,141,35,55,238,37,55,173 :REM*184
4Ø48 DATA37,55,2Ø1,199,176,95,238,37
                                        :REM*115
4Ø49 DATA55,32,1Ø8,54,176,79,173,36 :REM*9Ø
4Ø5Ø DATA55,2Ø8,79,174,62,55,232,236
                                        :REM*211
4Ø51 DATA37,55,24Ø,5,174,58,55,24Ø  :REM*4Ø
4Ø52 DATA8,174,64,55,236,62,55,2Ø8  :REM*19
4Ø53 DATA23,32,85,54,141,45,55,32  :REM*12Ø
4Ø54 DATA85,54,32,195,53,173,45,55  :REM*53
4Ø55 DATA32,195,53,162,1,142,58,55 :REM*178
4Ø56 DATA173,37,55,141,62,55,173,38:REM*1Ø3
4Ø57 DATA55,32,166,53,173,39,55,32 :REM*126
4Ø58 DATA166,53,173,37,55,32,166,53:REM*151
4Ø59 DATA238,36,55,2Ø8,5,169,Ø,141  :REM*16
4Ø6Ø DATA36,55,2Ø6,37,55,32,149,54 :REM*117
4Ø61 DATA173,38,55,2Ø8,5,173,39,55 :REM*162
4Ø62 DATA24Ø,27,173,38,55,2Ø8,3,2Ø6  :REM*1
4Ø63 DATA39,55,2Ø6,38,55,32,1Ø8,54 :REM*228
4Ø64 DATA176,3,76,215,51,238,38,55 :REM*179
4Ø65 DATA2Ø8,3,238,39,55,174,58,55 :REM*116
4Ø66 DATA24Ø,25,173,38,55,32,195,53:REM*2Ø3
4Ø67 DATA173,39,55,32,195,53,173,37:REM*12Ø
4Ø68 DATA55,32,195,53,162,Ø,142,58 :REM*169
4Ø69 DATA55,24Ø,18,173,38,55,32,35 :REM*254
4Ø7Ø DATA54,173,39,55,32,35,54,173 :REM*117
4Ø71 DATA37,55,32,35,54,173,59,55  :REM*212
4Ø72 DATA2Ø1,1Ø,144,3,32,2,54,32    :REM*253
4Ø73 DATA183,53,141,37,55,141,62,55 :REM*36
4Ø74 DATA2Ø1,255,24Ø,15,32,183,53,141
                                        :REM*223
4Ø75 DATA39,55,32,183,53,141,38,55  :REM*82
4Ø76 DATA76,157,51,173,59,55,24Ø,6 :REM*195
4Ø77 DATA32,2,54,24,144,245,32,21Ø :REM*14Ø
4Ø78 DATA53,141,37,55,2Ø1,255,2Ø8,1:REM*127
4Ø79 DATA96,32,21Ø,53,141,47,55,32  :REM*66
4Ø8Ø DATA21Ø,53,141,46,55,32,21Ø,53:REM*161
4Ø81 DATA141,45,55,32,21Ø,53,141,44 :REM*62
4Ø82 DATA55,32,79,53,76,38,53,173  :REM*141
4Ø83 DATA37,55,41,7,141,48,55,173  :REM*25Ø
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Listing 1 continued.

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4084 DATA44,55,41,7,141,49,55,173  :REM*219
4085 DATA45,55,141,39,55,173,44,55 :REM*206
4086 DATA141,38,55,172,48,55,185,50:REM*255
4087 DATA55,172,49,55,57,26,55,208  :REM*58
4088 DATA3,32,142,54,206,49,55,16  :REM*147
4089 DATA5,169,7,141,49,55,173,44  :REM*250
4090 DATA55,208,3,206,45,55,206,44  :REM*65
4091 DATA55,173,45,55,48,15,205,47 :REM*202
4092 DATA55,144,10,208,194,173,44,55:REM*41
4093 DATA205,46,55,176,186,96,141,76 :REM*2
4094 DATA55,169,174,32,224,53,165,174
                                    :REM*231
4095 DATA208,2,198,175,198,174,96,230
                                    :REM*214
4096 DATA174,208,2,230,175,169,174,32
                                    :REM*124
4097 DATA244,53,96,141,76,55,169,158
                                    :REM*129
4098 DATA32,224,53,230,158,208,2,230:REM*80
4099 DATA159,96,165,158,208,2,198,159:REM*7
4100 DATA198,158,169,158,32,244,53,96
                                    :REM*174
4101 DATA142,77,55,162,0,160,0,141 :REM*185
4102 DATA185,2,173,76,55,32,119,255 :REM*30
4103 DATA174,77,55,96,142,77,55,162:REM*217
4104 DATA0,160,0,32,116,255,174,77 :REM*126
4105 DATA55,96,32,60,54,141,44,55  :REM*255
4106 DATA32,60,54,141,45,55,32,60  :REM*230
4107 DATA54,141,46,55,32,60,54,141 :REM*175
4108 DATA47,55,32,60,54,141,37,55  :REM*216
4109 DATA76,79,53,238,59,55,172,61  :REM*91
4110 DATA55,153,65,55,238,61,55,172:REM*170
4111 DATA61,55,192,11,144,5,160,0    :REM*5
4112 DATA140,61,55,96,206,59,55,172:REM*222
4113 DATA60,55,185,65,55,238,60,55 :REM*163
4114 DATA172,60,55,192,11,144,5,160:REM*108
4115 DATA0,140,60,55,96,206,59,55   :REM*51
4116 DATA206,61,55,172,61,55,16,5   :REM*76
4117 DATA160,10,140,61,55,172,61,55 :REM*23
4118 DATA185,65,55,96,32,215,54,141:REM*234
4119 DATA34,55,173,38,55,41,7,170  :REM*161
4120 DATA189,26,55,45,34,55,240,7   :REM*36
4121 DATA173,40,55,240,7,56,96,173  :REM*65
4122 DATA40,55,240,249,24,96,173,40:REM*148
4123 DATA55,240,13,208,5,173,40,55  :REM*79
4124 DATA208,6,169,0,141,41,55,44  :REM*106
4125 DATA169,1,141,41,55,32,215,54  :REM*67
4126 DATA141,34,55,173,38,55,41,7  :REM*138
4127 DATA170,189,26,55,174,41,55,240
                                    :REM*133
4128 DATA5,13,34,55,208,5,73,255    :REM*140
4129 DATA45,34,55,141,34,55,162,18 :REM*177
4130 DATA173,43,55,172,42,55,32,145 :REM*70
4131 DATA48,173,34,55,76,172,48,174:REM*171
4132 DATA37,55,160,0,169,80,32,28    :REM*12
4133 DATA49,173,39,55,141,34,55,138:REM*101
4134 DATA72,173,38,55,78,34,55,106  :REM*26
4135 DATA78,34,55,106,78,34,55,106  :REM*29
4136 DATA174,34,55,141,34,55,104,24:REM*136
4137 DATA109,34,55,141,42,55,152,105:REM*21
4138 DATA0,141,43,55,162,18,173,43 :REM*116
4139 DATA55,172,42,55,32,145,48,76 :REM*109
4140 DATA161,48,128,64,32,16,8,4   :REM*110
4141 DATA2,1,0,0,0,0,0,0             :REM*31
4142 DATA0,0,0,0,0,0,0,0,0          :REM*240
4143 DATA0,0,0,0,0,0,0,0,0          :REM*241
4144 DATA0,0,0,0,0,0,0,0,0          :REM*242
4145 DATA0,0,0,0,0,0,0,0,0          :REM*243
4146 DATA0,0,0,0,0,0,0,0            :REM*104
4150 BSAVE"P.PATTERN.FILL",B0,P12992 TO P14
     158                            :REM*246
5000 FORZ=15232TO15276:READY:POKEZ,Y:NEXT
                                    :REM*165
5001 DATA32,201,255,169,0,32,210,255
                                    :REM*242
5002 DATA169,0,32,210,255,169,16,32 :REM*41
5003 DATA210,255,173,48,50,32,210,255
                                    :REM*214
5004 DATA96,32,198,255,32,207,255,32
                                    :REM*129
5005 DATA207,255,32,207,255,32,207,255
                                     :REM*68
5006 DATA141,48,50,96,5             :REM*115
5010 BSAVE"P.L/S.K",B0,P15232 TO P15276
                                    :REM*43
6000 FORZ=15616TO15804:READY:POKEZ,Y:NEXT
                                    :REM*151
6001 DATA32,128,3,32,9,136,224,5    :REM*112
6002 DATA176,109,202,142,173,61,189,184
                                    :REM*107
6003 DATA61,141,168,61,32,9,136,142 :REM*78
6004 DATA131,61,169,0,141,0,255,141 :REM*89
6005 DATA178,61,141,179,61,32,127,61:REM*86
6006 DATA162,25,142,175,61,32,143,61
                                    :REM*135
6007 DATA174,173,61,189,180,61,141,176
                                    :REM*72
6008 DATA61,162,80,142,177,61,162,18:REM*63
6009 DATA173,179,61,172,178,61,32,145
                                    :REM*16
6010 DATA48,32,161,48,32,210,255,206:REM*83
6011 DATA177,61,208,245,206,174,61,16
                                    :REM*62
6012 DATA20,174,173,61,142,174,61,24
                                    :REM*183
6013 DATA173,178,61,105,80,141,178,61
                                    :REM*48
6014 DATA144,3,238,179,61,206,176,61
                                    :REM*253
6015 DATA208,199,206,175,61,208,182,32
                                    :REM*42
6016 DATA204,255,169,4,76,195,255,162
                                    :REM*31
6017 DATA4,138,160,5,32,186,255,32  :REM*26
6018 DATA192,255,162,4,76,201,255,162
                                    :REM*115
6019 DATA0,189,159,61,8,41,127,32    :REM*38
6020 DATA210,255,232,40,16,243,96,27
                                    :REM*141
6021 DATA71,49,54,48,59,56,48,59    :REM*142
6022 DATA50,59,50,27,218,0,0,0      :REM*113
6023 DATA0,0,0,0,8,16,24,32         :REM*172
6024 DATA49,50,51,52,255            :REM*235
6030 BSAVE"OLIVETTI",B0,P15616 TO P15804
                                    :REM*223
7000 FORZ=15616TO15940:READY:POKEZ,Y:NEXT
                                    :REM*163
7001 DATA32,128,3,32,9,136,202,142  :REM*54
7002 DATA54,62,189,56,62,141,55,62 :REM*191
7003 DATA189,60,62,141,38,62,32,9  :REM*244
7004 DATA136,142,191,61,173,0,255,41
                                    :REM*129
7005 DATA254,141,0,255,32,183,61,162
                                    :REM*132
7006 DATA0,142,41,62,142,42,62,162  :REM*85
7007 DATA80,142,40,62,173,41,62,72 :REM*152
7008 DATA173,42,62,72,32,204,61,173 :REM*25
7009 DATA41,62,72,173,42,62,72,32  :REM*244
7010 DATA244,61,32,226,61,104,141,42
                                    :REM*237
7011 DATA62,104,168,200,208,3,238,42:REM*30
7012 DATA62,140,41,62,206,40,62,208:REM*241
7013 DATA222,172,54,62,185,64,62,160
                                    :REM*152
7014 DATA80,140,46,62,160,0,140,47  :REM*55
7015 DATA62,74,176,9,14,46,62,46    :REM*86
7016 DATA47,62,24,144,244,104,168,104
                                    :REM*103
7017 DATA24,109,46,62,141,41,62,152:REM*254
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Listing 1 continued.

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7Ø18 DATA1Ø9,47,62,141,42,62,2Ø6,38:REM*239
7Ø19 DATA62,2Ø8,156,32,2Ø4,255,169,4
                                    :REM*188
7Ø2Ø DATA32,195,255,96,142,44,62,14Ø
                                    :REM*127
7Ø21 DATA45,62,162,18,173,45,62,172:REM*2Ø2
7Ø22 DATA44,62,32,145,48,32,161,48 :REM*129
7Ø23 DATA174,44,62,172,45,62,96,169:REM*188
7Ø24 DATAØ,133,183,162,4,138,16Ø,5 :REM*159
7Ø25 DATA32,186,255,32,192,255,162,4:REM*58
7Ø26 DATA32,2Ø1,255,96,162,Ø,189,218:REM*47
7Ø27 DATA61,32,21Ø,255,232,224,8,2Ø8:REM*26
7Ø28 DATA245,96,13,1Ø,27,49,27,75   :REM*89
7Ø29 DATA128,2,16Ø,8,162,7,3Ø,46    :REM*19Ø
7Ø3Ø DATA62,1Ø6,2Ø2,16,249,32,21Ø,255
                                    :REM*11
7Ø31 DATA136,2Ø8,241,96,174,54,62,189
                                    :REM*168
7Ø32 DATA64,62,141,39,62,172,42,62 :REM*225
7Ø33 DATA174,41,62,32,156,61,72,138:REM*126
7Ø34 DATA24,1Ø5,8Ø,144,1,2ØØ,17Ø,2Ø6
                                    :REM*133
7Ø35 DATA39,62,2Ø8,239,162,7,172,55 :REM*16
7Ø36 DATA62,1Ø4,157,46,62,2Ø2,48,5  :REM*15
7Ø37 DATA136,2Ø8,247,24Ø,241,96,Ø,Ø :REM*3Ø
7Ø38 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø            :REM*75
7Ø39 DATAØ,Ø,Ø,Ø,Ø,Ø,1,Ø           :REM*2Ø4
7Ø4Ø DATA1,2,4,8,25,5Ø,1ØØ,2ØØ      :REM*123
7Ø41 DATA8,4,2,1,255                :REM*164
7Ø5Ø BSAVE "SPIRIT8Ø",BØ,P15616 TO P1594Ø
                                    :REM*129
7Ø6Ø POKE15837,49:POKE15839,76      :REM*35
7Ø7Ø BSAVE "EPSON",BØ,P15616 TO P1594Ø
                                    :REM*141
8ØØØ PRINT"{CRSR DN}ALL DONE!"      :REM*163
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Listing 2. *MAKE UH V1.1*

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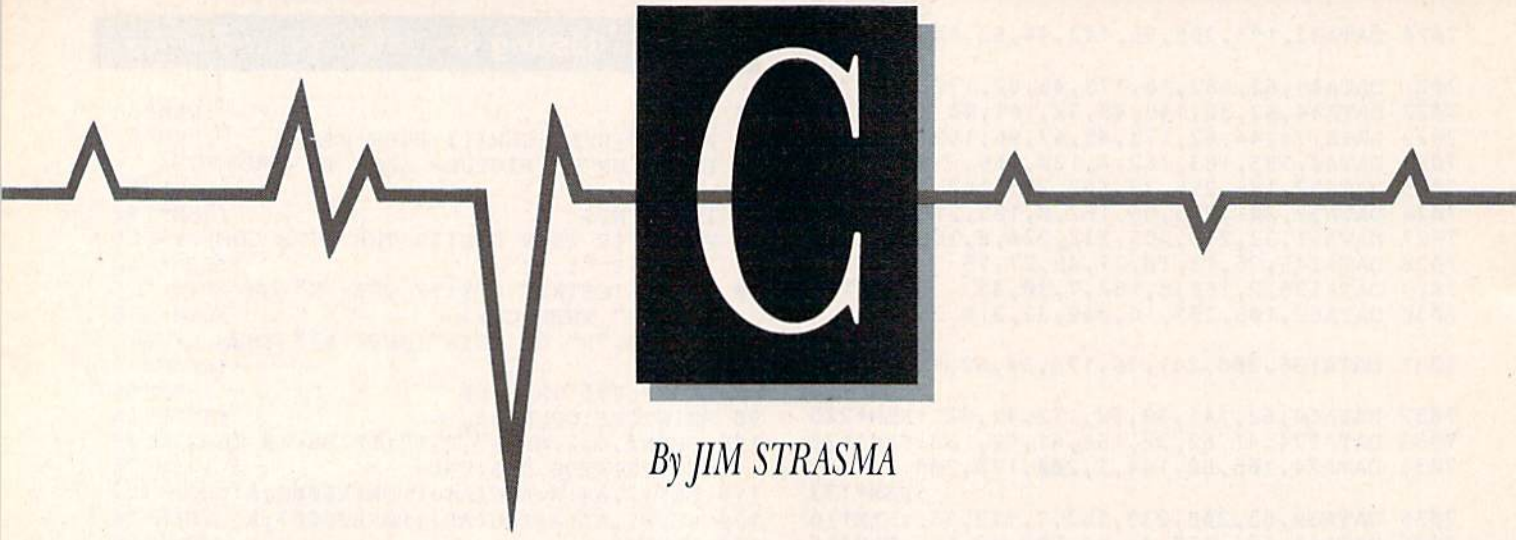
1Ø GRAPHIC1,1:GRAPHIC5              :REM*44
2Ø PRINT"{SHFT CLR}{CRSR DN} MAKING NEW ULT
   RA HIRES V1.1"                   :REM*194
3Ø BLOAD"ULTRA HIRES",BØ,P7168      :REM*25Ø
4Ø BLOAD"P.PATTERN.FILL",BØ,P12992   :REM*2
5Ø BLOAD"P.UHCIRCLE",BØ,P1416Ø      :REM*25Ø
6Ø BLOAD"P.ULTRA.K",BØ,P1536Ø       :REM*25Ø
7Ø BLOAD"P.ULTRAPLOT",BØ,P9Ø35      :REM*216
8Ø BLOAD"P.L/S.K",BØ,P15232         :REM*58
9Ø PRINT"{CRSR DN}ENTER DESIRED PRINTER DRI
   VER"                             :REM*152
1ØØ PRINT"1=OLIVETTI PR23ØØ{2 SPACEs}2=EPSO
   N{2 SPACEs}3=SPIRIT 8Ø"          :REM*194
11Ø GETKEY A$                       :REM*92
12Ø IF A$="1"THEN BLOAD"OLIVETTI",BØ,P15616
   :GOTO16Ø                         :REM*154
13Ø IF A$="2"THEN BLOAD"EPSON",BØ,P15616:GO
   TO16Ø                            :REM*224
135 IF A$="3"THEN BLOAD"SPIRIT8Ø",BØ,P15616
   :GOTO16Ø                         :REM*191
14Ø GOTO11Ø                         :REM*86
16Ø POKE8513,Ø:POKE8514,6Ø          :REM*2Ø
17Ø POKE98ØØ,57:POKE98Ø1,37:POKE9852,57:POK
   E9853,37:POKE9964,57:POKE9965,37:REM*92
18Ø POKE8799,192                    :REM*64
19Ø POKE86Ø2,Ø:POKE86Ø3,61          :REM*146
2ØØ POKE11822,128:POKE11823,59:POKE11887,15
   3:POKE11888,59                   :REM*1Ø
21Ø POKE12236,197:POKE12237,6Ø      :REM*116
22Ø FOR T=12421 TO 12432:READ A:POKE T,A:NE
   XT                               :REM*2Ø6
23Ø DATA 32,87,65,76,82,85,83,79,7Ø,84,32,3
   2                                :REM*2Ø6
24Ø RENAME "ULTRA HIRES" TO "ULTRA HIRES.OL
   D"                               :REM*248
25Ø BSAVE"ULTRA HIRES",BØ,P7168 TO P16383
                                    :REM*216
26Ø PRINT"{2 CRSR DNs}DONE!"        :REM*217
27Ø END                             :REM*17
```

Listing 3. *UH.PIC CONVERT*

```
1Ø FAST                             :REM*48
2Ø PRINT"{SHFT CLR}{2 CRSR DNs}"    :REM*62
3Ø PRINT"ENTER PICTURE NAME TO CONVERT";
                                    :REM*6
4Ø INPUT NF$                        :REM*152
5Ø PRINT"{2 CRSR DNs}IS THE FILE COMPRESSED
   (Y/N)? ";                        :REM*162
6Ø CF=255:GETKEY CF$:IF CF$="Y" OR CF$= "{S
   HFT Y}" THEN CF=1                :REM*138
7Ø IF CF$="N" OR CF$="{SHFT N}" THEN CF=Ø
                                    :REM*216
8Ø IF CF=255 THEN 6Ø                :REM*88
9Ø PRINTCF$:OPEN1,8,15              :REM*166
1ØØ OPEN2,8,2,NF$+",P,R":IF DS<>Ø THEN CLOS
   E2:PRINTDS,DS$:END               :REM*78
11Ø GET#2,A$:A=ASC(A$):POKE2ØØØ2,A :REM*192
12Ø GET#2,A$:A=ASC(A$):POKE2ØØØ3,A  :REM*1Ø
13Ø CLOSE2                          :REM*15Ø
14Ø BLOAD ""+NF$,BØ,P2ØØØ4          :REM*66
15Ø EF=PEEK(174)+PEEK(175)*256      :REM*158
16Ø IF DS<>Ø THEN PRINT DS,DS$:END  :REM*2Ø
17Ø NF$=LEFT$(NF$,12)+".NEW":PRINT"{2 CRSR
   DNs}WRITING ";NF$;" ..."         :REM*46
18Ø POKE2ØØØ,16:POKE2ØØ1,CF         :REM*174
19Ø BSAVE ""+NF$,BØ,P2ØØØØ TO PØ+EF:REM*212
2ØØ CLOSE1:PRINT"ALL DONE!":END     :REM*146
```


Circle 192 on Reader Service card.

COMMODORE CLINIC



By JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question on a postcard *(limit of one question per card) to:*

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Macomb, IL 61455-6100

Queries are answered only through this column and, due to the volume of mail, only questions likely to appeal to the majority of our readers can be published.

HARDWARE

Q: *Will* RUN *support the Amiga with articles and type-in programs like they are providing for the C-64 and C-128?*

Pete Hendler
Lillington, NC

A: CW Communications, the company that sponsors *RUN*, also publishes a magazine especially for Amiga owners, called *AmigaWorld*, headed by veteran *RUN* staffers. This gives proper coverage to the new machine, while allowing *RUN* to focus on the C-64 and C-128. We expect many *RUN* subscribers will enjoy both magazines.

Q: *Is it true that software companies are creating new products that cannot be loaded by the Indus GT disk drive because these disks contain codes meant to prevent duplication?*

Alan Ludwig
Staten Island, NY

A: Yes, it's true, although that wasn't the companies' intent. In trying to prevent even skilled programmers from duplicating their disks, several companies have used non-standard disk commands dependent on the precise ROM in the Commodore 1541. Some of these programs won't even run on Commodore's 1571 drive, let alone on Commodore-compatible drives like the Indus.

The only solution is not to buy copy-protected programs you can't return. Personally, I go a step further and don't buy copy-protected programs at all. That allows me to use any disk drive I like.

Q: *It's logical that an 80-column card uses twice the memory on the C-64. Can products that expand Basic memory help this, and will the result be 100% compatible with programs?*

Darren Cohen
Huntington Beach, CA

A: Yes, memory-mapped 80-column displays do require more memory than 40-column equivalents, typically 2K of RAM instead of 1K. (Since 80-column cards for the C-64 are monochrome, color RAM needs are unchanged.) However, you will probably notice a loss of more Basic memory than this. The Batteries Included BI-80, for example, also uses some memory for added Basic commands.

Unfortunately, current expanded-memory products are not able to expand Basic memory while at the same time guaranteeing 100% compatibility with other programs, let alone an 80-column card.

If you need both an 80-column display and added memory, you might be happiest trading up to a C-128, which already contains those features.

Q: *Can used ribbons be reinked if they are otherwise in good shape? I have a Tally Spirit 80 printer.*

James David
Bloomington, MN

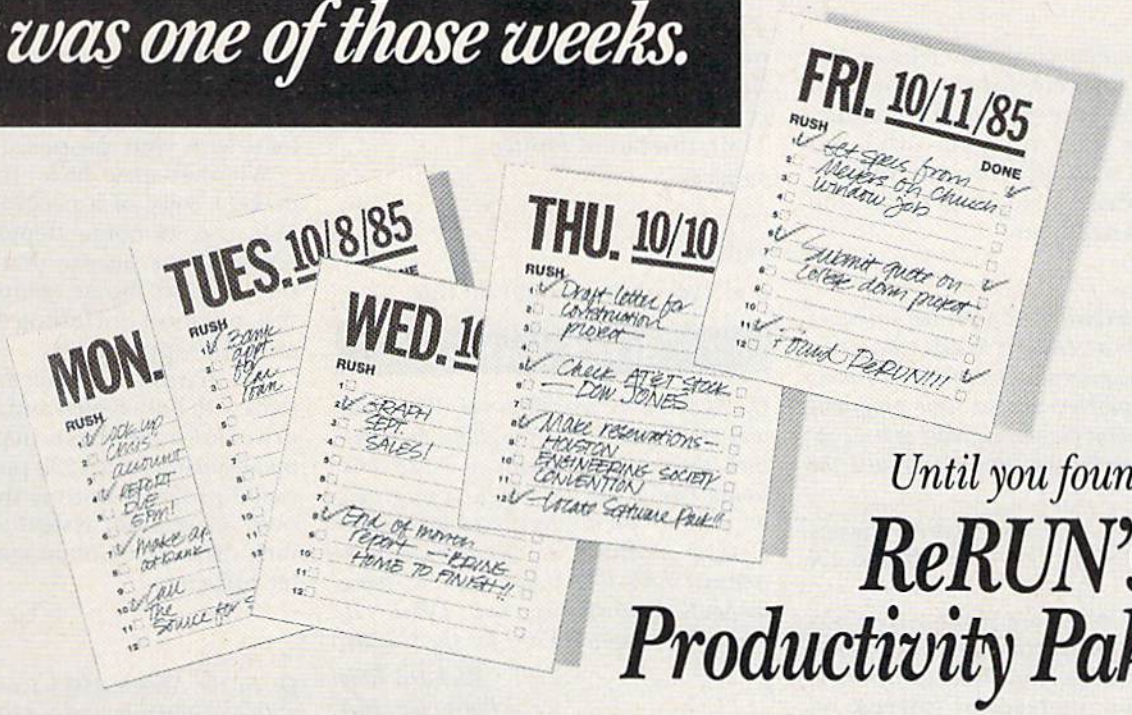
A: Yes, they can. Computer Friends (Suite 10, 6415 SW Canyon Court, Portland, OR 97225; 503-297-2321) is one supplier of the special inks and reinking machines needed. They have recently announced universal models that work on most printers, including yours.

Q: *Why must there be a hole in the side of a disk in order for the disk drive to be able to write? Are the holes not put on commercial disks as a protection from pirates?*

Pete Talwar
New City, NY

A: Properly used, the hole is both a way of making sure the disk is put into the disk drive correctly and a way of telling the hardware in the drive whether or not the disk may be altered. On the 1541, a light sensor on the side of the drive mechanism notices whether or not the disk may be altered. By simply covering the hole with the foil tabs packed with most disks, or even with a strip of opaque tape, you can protect an important disk from being accidentally changed.

It was one of those weeks.



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Commercial companies leave the holes off entirely, for the same reason—to be sure you won't accidentally alter their program disks. Do not cut a write-protect hole in such disks unless you no longer want the programs on them.

Q: I have a Cardprint A printer interface connected to an Olivetti Praxis typewriter, with a typewriter interface from Williams Labs. My problem is that some programs require several blank linefeeds, and I cannot get these on my printer. What's the secret?

Larry Thomas
Hooks, TX

A: I used to have a printer that was nearly identical to yours, and I had the same problem. The solution is not to send linefeeds or carriage returns by themselves. Instead, send a single space followed by a carriage return (and linefeed, if needed). Thus, instead of typing

```
PRINT#4
```

try

```
PRINT#4," "
```

and everything should be fine.

SOFTWARE

Q: At work, we use DBase II, WordStar, and other such CP/M programs on eight-inch disks. I just bought a C-128 and would love to use some of these programs on it. Since we are registered purchasers of these programs, is there any way to convert them so I could work at home without repurchasing, say, DBase II, which is listing for $700 for the C-128?

Richard Ellis
Plainville, MA

A: I agree that $700 for DBase II on the C-128 is utterly ridiculous, but there are hardware and legal problems with your proposed solution.

Whether you have the right to make a copy of a program for business use at home depends on the terms of the license that came with the program. Some companies allow this, but most (including Ashton-Tate and Micropro) don't.

The hardware problem is that systems with both 8-inch and 5¼-inch disk drives are quite scarce. In practice, this means using an RS-232 port and a terminal program to copy the programs onto a computer system that uses 5¼-inch disks in a Commodore-compatible format.

Q: In the March 1985 issue of RUN, *I noticed information about a church package for the 64. That is what I need. Did it materialize?*

Rev. Philip Heinze
Niagara Falls, Ontario
Canada

A: Yes, it did. It's called the Electric Evangelist, is used by about 200 churches and is now available for $39.95 from its three authors, Ken Bedell, Larry Woolard and myself, at PO Box 6100, Macomb, IL 61455.

Q: I am very interested in artificial intelligence. Unfortunately, I have been unable to locate the Commodore LISP or PROLOG I need for such programming.

I'm told that about five years ago OWL-LISP was on the market in Britain for the Pet computer. Perhaps you could provide me with the address of a computer club in Britain that I could pursue for information.

Nic Barker
Walla Walla, WA

A: The club best able to help you there is ICPUG. Its chairman and contact for technical queries is Mike Todd (27 Nursery Gardens, Lodgefield, Welwyn Garden City, Herts, AL7 1SF, England). For membership information, contact Jack Cohen (30 Brancaster Road, Newbury Park, Ilford, Essex, IG2 7EP, England).

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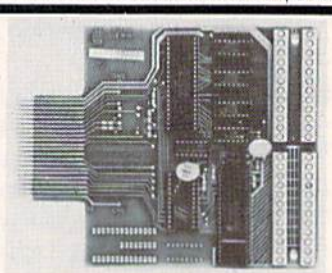

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PROGRAMMING

Q: When I make a mistake and press the delete key, the error erases on the screen, but still prints out on paper. Is there another command I have to use?

Darlene Davis
Fairfield, CA

A: I can think of two common causes for this problem. First, many new programmers forget to press the return key after correcting a Basic program line on the screen. Until you press return on that line, the correction will not become part of your program.

Another common cause is a program that accepts all keystrokes, including delete, as part of its input. The resulting data appears all right on the screen, because the deletion works normally there, but can't work on most printers. Even if your printer can back up one space, it can't erase characters it has already printed.

In this case, the solution is to modify the Get loop used to accept input data in your program. Add an If statement to make the Get loop notice the delete key; then, instead of adding the delete to the growing string of characters, have the loop reassign the string to all but the string's own last character, using a subroutine similar to this:

```
10 A$=""
15 L=LEN(A$)
20 IF L > 254 THEN 65
25 GET G$
30 PRINT G$;
35 IF G$ <> CHR$(20) THEN 50
40 IF L THEN A$=LEFT$(A$, L-1)
45 GOTO 15
50 IF G$=CHR$(13) THEN 65
55 A$=A$+G$
60 GOTO 15
65 RETURN
```

Q: The VIC-20 allows easy placement of characters anywhere on the screen from within a program, by Poking row and column locations with the following:

POKE 214,ROW
POKE 211,COL

What are the comparable locations on the 64?

J. Grove
Chicago, IL

A: Those locations, like most others in the first three pages of memory, are the same on the C-64 as on the VIC-20. Just follow the same two Pokes with a simple Print statement, to be sure all screen variables are properly updated, and remember that both row and column counts start with zero.

Q: On my C-64, I found two Pokes I call pagers:

POKE 53265,85:REM EVERY DIRECTION
POKE 53265,95:REM DOWN

The screen's text section is reduced, and, on some sides of the screen, the cursor is cut off. Am I really paging? I'm seven years old.

Joshua Shagam
Albuquerque, NM

A: Since you uncovered this effect at age seven, I asked my nine-year-old son to help find the answer. Here's what we found out for you.

Bits 0–2 of memory location 53265 control fine-scrolling of the screen, allowing a user to move text on the screen vertically one row of pixels at a time, rather than the usual full character at a time (eight rows of pixels).

Bit 3 of that same location selects either a 24- or 25-line display. By selecting 24 lines, you can create a line of text without making it immediately visible, thereby helping to preserve the illusion of smooth-scrolling beyond the eight-pixel range provided by the VIC II chip.

Your first Poke selects a 24-line display, with a vertical offset of five rows of pixels. The second Poke selects a 25-line display, with a seven-row vertical offset. Just be sure to leave the high-order four bits alone, as they have other uses.

Here is a sample routine for playing with this effect:

```
10 B3=8:REM 25 ROWS, 0 FOR 24 ROWS
20 B0=0:REM PIXEL OFFSET, 0-7
30 POKE 53265, (PEEK(53265 AND
   240)+(B3 AND 8)+(B0 AND 7))
```

R

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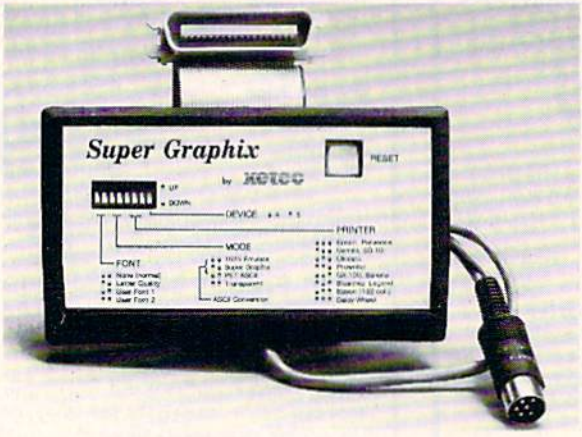

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Checksums for *RUN* 1985 Programs

Last February, in response to many reader inquiries, we began a series of checksum listings for programs published in 1985 before our C-64 checksum program, 64 Perfect Typist, appeared in September. August was covered in February and July in April's issue. Below, you will find the June programs' checksum listings.

To use the checksums, you must first load and run 64 Perfect Typist (see How to Type Listings, on page 110); then get out your June issue and begin typing in any program you find in the listings below. Every time you hit the return key, a number from 0 to 255 will appear. If you enter a line correctly, the number following the ":REM" next to the line number will appear.*

If you have already entered one of the programs from June and desire to check it for accuracy, simply enter 64 Perfect Typist, list lines individually or in small groups and position the cursor on the line you want to check. Next, press the return key, and, if you've entered the line correctly, the number that appears below the line will match the number following the ":REM" in the listings.*

You can look forward to seeing more of these listings of 1985 programs in subsequent 1986 issues of RUN.

Double Your Basic!, by Robert Rockefeller; June, p. 102.

```
1Ø      :REM*2Ø
15      :REM*235
2Ø      :REM*252
3Ø      :REM*1Ø8
4Ø      :REM*118
5Ø      :REM*144
6Ø       :REM*36
7Ø       :REM*5Ø
8Ø      :REM*158
9Ø      :REM*184
1ØØ      :REM*76
32768   :REM*146
32778   :REM*212
32788   :REM*1Ø2
32798    :REM*1Ø
32808   :REM*234
32818    :REM*42
32828    :REM*22
32838   :REM*142
32848    :REM*28
32858   :REM*186
32868    :REM*66
32878    :REM*52
32888   :REM*186
32898   :REM*186
32908    :REM*62
32918   :REM*118
32928    :REM*94
32938   :REM*218
32948    :REM*12
32958   :REM*25Ø
32968    :REM*18
32978   :REM*136
32988    :REM*2Ø
32998    :REM*98
33008   :REM*112
33018   :REM*216
33028    :REM*23
33038   :REM*249
33048   :REM*187
33058    :REM*39
33068    :REM*71
33078   :REM*157
33088   :REM*233
33098   :REM*1Ø9
33108    :REM*11
33118   :REM*155
33128   :REM*1Ø3
33138   :REM*167
33148   :REM*169
33158   :REM*221
33168   :REM*197
33178    :REM*43
33188    :REM*61
33198   :REM*189
33208    :REM*27
33218   :REM*211
33228   :REM*141
33238    :REM*97
33248   :REM*127
33258   :REM*241
33268   :REM*129
33278   :REM*123
33288   :REM*23Ø
33298   :REM*18Ø
33308   :REM*158
33318    :REM*68
33328   :REM*142
33338    :REM*16
33348   :REM*186
33358   :REM*19Ø
33368     :REM*2
33378   :REM*188
33388    :REM*82
33398    :REM*78
33408   :REM*17Ø
33418   :REM*254
33428   :REM*186
33438   :REM*112
33448    :REM*88
33458   :REM*12Ø
33468    :REM*2Ø
33478   :REM*216
33488    :REM*92
33498   :REM*2Ø2
33508   :REM*142
33518   :REM*152
33528    :REM*24
33538    :REM*73
33548    :REM*37
33558    :REM*35
33568   :REM*245
33578    :REM*47
33588   :REM*199
33598    :REM*37
33608   :REM*177
33618    :REM*41
33628   :REM*141
33638   :REM*233
33648   :REM*2Ø9
33658   :REM*191
33668   :REM*183
33678   :REM*135
33688   :REM*239
33698     :REM*5
33708    :REM*43
33718   :REM*2Ø5
33728    :REM*19
33738    :REM*75
33748     :REM*7
33758    :REM*47
33768   :REM*187
33778    :REM*77
33788   :REM*141
33798   :REM*11Ø
33808   :REM*15Ø
33818     :REM*Ø
33828    :REM*62
33838    :REM*42
33848   :REM*188
33858   :REM*124
33868   :REM*1Ø4
33878   :REM*1ØØ
33888    :REM*58
33898   :REM*248
33908   :REM*168
33918    :REM*32
33928    :REM*22
33938   :REM*182
33948    :REM*92
33958   :REM*176
33968     :REM*4
33978    :REM*96
33988   :REM*252
33998   :REM*226
34008    :REM*8Ø
34018   :REM*154
34028   :REM*214
34038     :REM*8
34048    :REM*93
34058    :REM*99
34068   :REM*239
34078    :REM*51
34088    :REM*43
34098   :REM*139
34108   :REM*153
34118   :REM*249
34128    :REM*55
34138    :REM*51
34148    :REM*79
34158    :REM*43
34168    :REM*49
34178    :REM*41
34188    :REM*85
34198   :REM*2Ø7
34208    :REM*73
34218   :REM*231
34228   :REM*215
34238   :REM*243
34248     :REM*3
34258   :REM*181
34268    :REM*57
34278     :REM*5
34288   :REM*165
34298   :REM*219
34308   :REM*182
34318   :REM*152
34328   :REM*17Ø
34338    :REM*78
34348    :REM*76
34358   :REM*172
34368   :REM*2Ø4
34378   :REM*114
34388     :REM*Ø
34398   :REM*126
34408   :REM*21Ø
34418   :REM*13Ø
34428   :REM*186
34438    :REM*72
34448   :REM*22Ø
34458     :REM*Ø
34468    :REM*36
34478    :REM*82
34488   :REM*156
34498   :REM*172
34508   :REM*22Ø
34518   :REM*2Ø6
34528   :REM*21Ø
34538    :REM*76
34548   :REM*14Ø
34558   :REM*232
34568   :REM*149
34578   :REM*247
34588   :REM*121
34598   :REM*247
34608    :REM*31
34618   :REM*119
34628   :REM*153
34638   :REM*133
34648    :REM*49
34658   :REM*197
34668   :REM*161
34678    :REM*31
34688    :REM*71
34698    :REM*45
34708     :REM*1
34718   :REM*141
34728    :REM*73
34738   :REM*227
34748    :REM*43
34758    :REM*69
34768   :REM*177
34778   :REM*185
34788   :REM*143
34798   :REM*231
34808   :REM*251
34818   :REM*162
34828    :REM*44
34838    :REM*9Ø
34848    :REM*76
34858   :REM*144
34868   :REM*1Ø2
34878   :REM*12Ø
34888   :REM*164
34898   :REM*216
34908   :REM*254
34918   :REM*1Ø6
38306   :REM*229
38316   :REM*147
38326   :REM*129
38336   :REM*151
38346    :REM*13
```

C-64 Big Letters, by Jimmie Bernard; June, p. 36.

Listing 1.

```
1Ø      :REM*13Ø
2Ø       :REM*9Ø
3Ø      :REM*1Ø8
4Ø       :REM*46
5Ø       :REM*36
6Ø        :REM*6
7Ø       :REM*66
75      :REM*133
8Ø      :REM*226
85      :REM*2Ø7
9Ø       :REM*7Ø
95       :REM*97
1ØØ     :REM*22Ø
1Ø5     :REM*237
11Ø     :REM*1Ø6
115     :REM*177
12Ø     :REM*12Ø
13Ø      :REM*54
14Ø     :REM*144
15Ø      :REM*46
16Ø     :REM*226
17Ø     :REM*24Ø
171     :REM*185
172     :REM*25Ø
173      :REM*71
174     :REM*166
175      :REM*49
176     :REM*212
177     :REM*189
178      :REM*74
179      :REM*83
18Ø     :REM*166
181     :REM*115
182      :REM*54
183      :REM*19
184     :REM*17Ø
185     :REM*137
186     :REM*1ØØ
187     :REM*119
188     :REM*116
189     :REM*175
19Ø      :REM*24
191     :REM*233
192     :REM*188
193     :REM*247
195     :REM*245
2ØØ     :REM*244
2Ø5     :REM*223
21Ø     :REM*1ØØ
215     :REM*233
22Ø     :REM*22Ø
222     :REM*1Ø2
225      :REM*97
23Ø     :REM*242
235      :REM*89
24Ø      :REM*26
25Ø      :REM*82
26Ø     :REM*151
262     :REM*137
265      :REM*68
27Ø     :REM*219
275      :REM*78
28Ø     :REM*2Ø1
29Ø      :REM*97
3ØØ     :REM*1Ø5
31Ø      :REM*79
32Ø      :REM*23
33Ø      :REM*55
34Ø     :REM*2Ø7
35Ø      :REM*75
36Ø     :REM*233
37Ø     :REM*165
38Ø      :REM*43
39Ø     :REM*2Ø9
4ØØ     :REM*145
41Ø     :REM*183
42Ø     :REM*199
43Ø     :REM*137
44Ø     :REM*243
45Ø      :REM*45
46Ø      :REM*87
47Ø     :REM*149
48Ø      :REM*67
49Ø      :REM*19
495      :REM*88
5ØØ     :REM*225
51Ø      :REM*93
52Ø     :REM*24Ø
53Ø      :REM*78
```

Listing 2.

```
17Ø      :REM*42
171       :REM*5
7ØØ     :REM*178
71Ø       :REM*8
72Ø     :REM*242
73Ø       :REM*2
74Ø     :REM*15Ø
75Ø      :REM*6Ø
76Ø       :REM*8
77Ø      :REM*55
78Ø       :REM*5
1ØØØ    :REM*115
1Ø1Ø    :REM*173
1Ø2Ø     :REM*37
1Ø3Ø     :REM*68
```

Listing 3.

```
1Ø       :REM*7Ø
2Ø       :REM*9Ø
3Ø      :REM*124
35      :REM*143
4Ø       :REM*64
45       :REM*77
5Ø      :REM*164
6Ø        :REM*6
7Ø       :REM*3Ø
8Ø      :REM*246
9Ø      :REM*152
1ØØ     :REM*2Ø8
1Ø5     :REM*167
11Ø      :REM*9Ø
12Ø      :REM*82
14Ø     :REM*184
15Ø      :REM*22
16Ø      :REM*56
165     :REM*2Ø9
17Ø      :REM*98
172      :REM*32
175     :REM*217
18Ø      :REM*52
19Ø     :REM*186
195      :REM*81
196      :REM*14
2ØØ      :REM*14
2Ø5     :REM*2Ø9
21Ø       :REM*8
215      :REM*65
22Ø     :REM*122
23Ø     :REM*15Ø
24Ø     :REM*142
25Ø     :REM*218
26Ø     :REM*233
27Ø      :REM*41
28Ø      :REM*55
29Ø     :REM*167
3ØØ     :REM*159
31Ø     :REM*121
32Ø     :REM*1Ø9
33Ø     :REM*199
34Ø      :REM*67
35Ø     :REM*185
1ØØØ    :REM*221
1ØØ5     :REM*28
1Ø1Ø     :REM*113
1Ø2Ø     :REM*123
1Ø25      :REM*19
1Ø3Ø      :REM*46
1Ø4Ø     :REM*154
1Ø45     :REM*145
1Ø46      :REM*88
1Ø47     :REM*153
1Ø48      :REM*16
1Ø49     :REM*253
1Ø5Ø     :REM*244
1Ø55     :REM*211
1Ø6Ø     :REM*1Ø2
1Ø65      :REM*49
1Ø7Ø     :REM*2ØØ
1Ø8Ø      :REM*34
1Ø9Ø     :REM*2Ø2
1Ø95     :REM*1Ø7
1Ø99     :REM*121
```

Call the Doctor, by John Tanzini; June, p. 50.

```
1ØØØ     :REM*117
1Ø1Ø     :REM*111
1Ø2Ø     :REM*171
1Ø3Ø     :REM*132
1Ø4Ø     :REM*212
1Ø5Ø     :REM*152
1Ø6Ø     :REM*178
1Ø7Ø     :REM*2Ø4
1Ø8Ø      :REM*7Ø
1Ø9Ø     :REM*112
11ØØ       :REM*6
111Ø     :REM*122
112Ø      :REM*1Ø
113Ø     :REM*13Ø
114Ø      :REM*74
115Ø     :REM*246
116Ø      :REM*7Ø
117Ø     :REM*254
118Ø     :REM*244
119Ø     :REM*166
12ØØ      :REM*9Ø
121Ø     :REM*192
122Ø      :REM*66
123Ø      :REM*7Ø
124Ø      :REM*86
125Ø     :REM*232
126Ø       :REM*2
127Ø     :REM*184
128Ø     :REM*2Ø7
129Ø     :REM*147
13ØØ     :REM*227
131Ø      :REM*93
132Ø      :REM*47
133Ø     :REM*177
134Ø      :REM*97
135Ø     :REM*151
136Ø     :REM*2Ø7
137Ø      :REM*97
138Ø      :REM*11
139Ø      :REM*35
14ØØ     :REM*157
141Ø     :REM*215
142Ø      :REM*63
143Ø     :REM*255
144Ø     :REM*189
145Ø     :REM*243
146Ø     :REM*193
147Ø     :REM*1Ø3
148Ø     :REM*171
149Ø      :REM*19
15ØØ     :REM*245
151Ø     :REM*141
152Ø     :REM*235
153Ø       :REM*9
154Ø     :REM*188
155Ø     :REM*228
156Ø     :REM*154
157Ø     :REM*1Ø4
158Ø     :REM*174
159Ø      :REM*7Ø
16ØØ      :REM*82
161Ø      :REM*28
162Ø      :REM*36
163Ø     :REM*114
164Ø      :REM*32
165Ø     :REM*178
166Ø     :REM*238
167Ø       :REM*6
168Ø      :REM*92
169Ø      :REM*46
17ØØ      :REM*36
171Ø      :REM*32
172Ø     :REM*172
173Ø     :REM*232
174Ø      :REM*32
175Ø     :REM*182
176Ø     :REM*152
177Ø     :REM*128
178Ø      :REM*66
179Ø      :REM*26
18ØØ      :REM*29
181Ø     :REM*187
182Ø     :REM*195
183Ø      :REM*93
184Ø      :REM*71
185Ø       :REM*7
186Ø     :REM*187
187Ø       :REM*3
188Ø     :REM*1Ø3
189Ø      :REM*71
19ØØ      :REM*85
191Ø      :REM*47
192Ø     :REM*191
193Ø     :REM*253
194Ø     :REM*221
195Ø     :REM*213
196Ø      :REM*31
197Ø     :REM*1Ø3
198Ø     :REM*1Ø7
199Ø     :REM*159
2ØØØ      :REM*67
2Ø1Ø      :REM*31
2Ø2Ø      :REM*67
2Ø3Ø      :REM*51
2Ø4Ø     :REM*2Ø7
2Ø5Ø     :REM*168
2Ø6Ø       :REM*4
2Ø7Ø      :REM*92
2Ø8Ø      :REM*92
2Ø9Ø     :REM*112
21ØØ     :REM*174
211Ø     :REM*18Ø
212Ø     :REM*158
213Ø     :REM*134
214Ø      :REM*84
215Ø     :REM*172
216Ø     :REM*214
217Ø     :REM*192
218Ø     :REM*254
219Ø       :REM*4
22ØØ     :REM*238
221Ø     :REM*226
222Ø      :REM*44
223Ø     :REM*156
224Ø     :REM*174
225Ø     :REM*144
226Ø       :REM*6
227Ø     :REM*132
228Ø     :REM*186
229Ø     :REM*252
23ØØ     :REM*144
231Ø      :REM*73
232Ø      :REM*87
233Ø     :REM*147
234Ø     :REM*1Ø7
235Ø     :REM*135
236Ø     :REM*145
237Ø     :REM*249
238Ø      :REM*29
239Ø     :REM*119
24ØØ     :REM*173
241Ø     :REM*123
242Ø      :REM*33
243Ø      :REM*31
244Ø     :REM*221
245Ø     :REM*153
246Ø      :REM*71
247Ø     :REM*235
248Ø     :REM*195
249Ø     :REM*127
25ØØ     :REM*215
251Ø     :REM*227
252Ø      :REM*15
253Ø       :REM*1
254Ø      :REM*47
255Ø      :REM*47
256Ø     :REM*132
257Ø      :REM*54
258Ø      :REM*36
259Ø     :REM*162
26ØØ      :REM*98
261Ø     :REM*134
262Ø     :REM*244
263Ø     :REM*19Ø
264Ø     :REM*218
265Ø      :REM*74
266Ø     :REM*216
267Ø      :REM*94
268Ø      :REM*36
269Ø      :REM*44
27ØØ     :REM*198
271Ø      :REM*86
272Ø     :REM*122
273Ø     :REM*186
274Ø      :REM*52
275Ø      :REM*66
276Ø     :REM*1Ø4
277Ø     :REM*232
278Ø      :REM*36
279Ø     :REM*252
28ØØ     :REM*144
281Ø     :REM*152
282Ø      :REM*73
283Ø      :REM*47
284Ø      :REM*23
285Ø      :REM*57
286Ø      :REM*45
287Ø      :REM*35
288Ø     :REM*1Ø7
289Ø      :REM*43
29ØØ     :REM*179
291Ø     :REM*1Ø3
292Ø     :REM*163
293Ø      :REM*43
294Ø      :REM*99
295Ø      :REM*39
296Ø     :REM*159
297Ø     :REM*155
298Ø      :REM*31
299Ø     :REM*183
3ØØØ     :REM*161
3Ø1Ø      :REM*89
3Ø2Ø      :REM*17
3Ø3Ø      :REM*31
3Ø4Ø     :REM*121
3Ø5Ø      :REM*51
3Ø6Ø     :REM*2Ø5
3Ø7Ø     :REM*183
3Ø8Ø      :REM*5Ø
3Ø9Ø     :REM*232
31ØØ      :REM*38
311Ø      :REM*68
312Ø     :REM*234
313Ø     :REM*1ØØ
314Ø     :REM*1Ø4
315Ø      :REM*42
316Ø      :REM*22
317Ø     :REM*136
318Ø     :REM*178
319Ø     :REM*192
32ØØ     :REM*12Ø
321Ø     :REM*212
322Ø     :REM*148
323Ø      :REM*88
324Ø     :REM*21Ø
325Ø       :REM*6
326Ø      :REM*52
327Ø     :REM*162
```

→

Listing continued.

```
328Ø    :REM*22
329Ø     :REM*6
33ØØ   :REM*1Ø6
331Ø    :REM*28
332Ø   :REM*174
333Ø   :REM*137
334Ø    :REM*57
335Ø   :REM*217
336Ø   :REM*161
337Ø   :REM*217
338Ø   :REM*225
339Ø   :REM*145
34ØØ     :REM*3
341Ø   :REM*129
342Ø   :REM*131
343Ø   :REM*1Ø3
344Ø   :REM*2Ø3
345Ø    :REM*51
346Ø   :REM*227
347Ø    :REM*67
348Ø   :REM*215
349Ø    :REM*45
35ØØ   :REM*199
351Ø    :REM*99
352Ø   :REM*129
353Ø    :REM*73
354Ø   :REM*2Ø3
355Ø   :REM*211
356Ø    :REM*91
357Ø    :REM*81
358Ø   :REM*249
359Ø    :REM*82
36ØØ    :REM*94
361Ø   :REM*118
362Ø   :REM*158
363Ø   :REM*138
364Ø   :REM*178
365Ø    :REM*12
366Ø   :REM*194
367Ø   :REM*172
368Ø   :REM*166
369Ø   :REM*192
37ØØ    :REM*76
371Ø    :REM*24
372Ø    :REM*72
373Ø   :REM*218
374Ø   :REM*18Ø
375Ø    :REM*46
376Ø    :REM*56
377Ø   :REM*236
378Ø   :REM*228
379Ø    :REM*86
38ØØ    :REM*96
381Ø   :REM*16Ø
382Ø   :REM*156
383Ø   :REM*164
384Ø   :REM*245
385Ø    :REM*21
386Ø    :REM*55
387Ø    :REM*21
388Ø   :REM*215
389Ø   :REM*153
39ØØ   :REM*139
391Ø    :REM*29
392Ø   :REM*229
393Ø   :REM*123
394Ø   :REM*193
395Ø    :REM*83
396Ø   :REM*197
397Ø    :REM*87
398Ø   :REM*217
399Ø   :REM*227
4ØØØ   :REM*177
4Ø1Ø   :REM*167
4Ø2Ø   :REM*113
4Ø3Ø    :REM*89
4Ø4Ø   :REM*239
4Ø5Ø    :REM*71
4Ø6Ø   :REM*151
4Ø7Ø   :REM*247
4Ø8Ø     :REM*9
4Ø9Ø    :REM*67
41ØØ    :REM*82
411Ø   :REM*196
412Ø   :REM*1Ø2
413Ø   :REM*12Ø
414Ø    :REM*22
415Ø   :REM*2ØØ
416Ø   :REM*124
417Ø   :REM*1Ø8
418Ø   :REM*136
419Ø   :REM*194
42ØØ   :REM*172
421Ø   :REM*254
422Ø     :REM*Ø
423Ø   :REM*122
424Ø   :REM*168
425Ø    :REM*3Ø
426Ø   :REM*2ØØ
427Ø   :REM*198
428Ø    :REM*44
429Ø    :REM*36
43ØØ    :REM*56
431Ø   :REM*248
432Ø   :REM*126
433Ø   :REM*166
434Ø   :REM*25Ø
435Ø    :REM*98
436Ø    :REM*83
437Ø    :REM*97
438Ø   :REM*117
439Ø   :REM*117
44ØØ   :REM*189
441Ø   :REM*177
442Ø   :REM*217
443Ø   :REM*133
444Ø    :REM*65
445Ø   :REM*2Ø1
446Ø    :REM*93
447Ø   :REM*175
448Ø   :REM*247
449Ø   :REM*249
45ØØ   :REM*227
451Ø    :REM*91
452Ø   :REM*247
453Ø   :REM*247
454Ø   :REM*133
455Ø   :REM*217
456Ø   :REM*135
457Ø   :REM*151
458Ø    :REM*19
459Ø   :REM*1Ø1
46ØØ    :REM*91
461Ø   :REM*234
462Ø   :REM*112
463Ø    :REM*64
464Ø   :REM*176
465Ø     :REM*2
466Ø   :REM*178
467Ø    :REM*62
468Ø     :REM*8
469Ø   :REM*24Ø
47ØØ   :REM*168
471Ø     :REM*2
472Ø   :REM*252
473Ø   :REM*176
474Ø    :REM*62
475Ø    :REM*26
476Ø    :REM*52
477Ø   :REM*218
478Ø   :REM*222
479Ø   :REM*14Ø
48ØØ   :REM*25Ø
481Ø   :REM*194
482Ø    :REM*84
483Ø    :REM*94
484Ø     :REM*6
485Ø   :REM*178
486Ø    :REM*62
487Ø   :REM*121
488Ø    :REM*93
489Ø   :REM*183
49ØØ   :REM*177
491Ø   :REM*1Ø3
492Ø   :REM*119
493Ø   :REM*2Ø7
494Ø   :REM*233
495Ø   :REM*219
496Ø   :REM*155
497Ø    :REM*45
498Ø   :REM*2Ø1
499Ø    :REM*39
5ØØØ    :REM*61
5Ø1Ø    :REM*77
5Ø2Ø    :REM*93
5Ø3Ø   :REM*219
5Ø4Ø   :REM*117
5Ø5Ø     :REM*7
```

C-64 Shuffle, by Buck Childress; June, p. 74.

```
5       :REM*237
1Ø       :REM*2Ø
15      :REM*157
2Ø      :REM*2Ø8
25       :REM*99
3Ø       :REM*18
4Ø      :REM*138
5Ø      :REM*152
6Ø      :REM*196
7Ø      :REM*148
8Ø      :REM*236
1ØØ     :REM*118
11Ø     :REM*19Ø
115     :REM*229
12Ø     :REM*18Ø
125     :REM*217
13Ø     :REM*126
135     :REM*245
14Ø     :REM*216
145     :REM*145
15Ø       :REM*Ø
16Ø     :REM*176
17Ø      :REM*1Ø
175     :REM*2Ø3
18Ø     :REM*138
185     :REM*131
19Ø      :REM*68
2ØØ      :REM*46
21Ø     :REM*198
22Ø      :REM*22
23Ø     :REM*162
24Ø      :REM*42
3ØØ     :REM*1Ø3
3Ø5     :REM*174
31Ø     :REM*215
315      :REM*7Ø
32Ø     :REM*175
325     :REM*142
33Ø      :REM*73
335     :REM*186
34Ø      :REM*73
345      :REM*32
35Ø      :REM*91
355     :REM*1Ø4
36Ø     :REM*115
365      :REM*68
375     :REM*18Ø
38Ø     :REM*235
385     :REM*174
39Ø     :REM*187
395     :REM*124
4ØØ     :REM*137
4Ø5     :REM*17Ø
41Ø     :REM*213
415     :REM*142
42Ø     :REM*1Ø7
425     :REM*124
43Ø     :REM*149
435     :REM*242
44Ø      :REM*17
445     :REM*248
45Ø     :REM*233
455      :REM*4Ø
46Ø     :REM*199
465       :REM*Ø
47Ø     :REM*127
475      :REM*22
48Ø       :REM*5
485      :REM*32
49Ø     :REM*243
495      :REM*56
5ØØ     :REM*229
51Ø      :REM*37
52Ø      :REM*38
53Ø     :REM*194
54Ø       :REM*Ø
55Ø       :REM*6
6ØØ       :REM*6
61Ø     :REM*214
62Ø     :REM*186
63Ø     :REM*1Ø8
65Ø     :REM*254
655     :REM*241
66Ø     :REM*1Ø8
665     :REM*143
67Ø      :REM*38
675     :REM*241
68Ø      :REM*92
685     :REM*2Ø9
7ØØ     :REM*1Ø2
71Ø     :REM*154
72Ø     :REM*248
73Ø      :REM*54
74Ø      :REM*2Ø
75Ø     :REM*222
76Ø     :REM*14Ø
8ØØ      :REM*65
81Ø     :REM*153
82Ø     :REM*155
83Ø      :REM*15
84Ø      :REM*81
85Ø      :REM*33
855      :REM*82
86Ø     :REM*245
87Ø     :REM*147
88Ø     :REM*173
89Ø      :REM*17
9ØØ     :REM*193
91Ø     :REM*2Ø5
92Ø      :REM*41
93Ø     :REM*111
94Ø     :REM*153
95Ø     :REM*143
96Ø      :REM*41
97Ø      :REM*59
98Ø     :REM*2Ø7
99Ø      :REM*49
995      :REM*96
1ØØØ     :REM*59
1Ø1Ø     :REM*213
1Ø2Ø      :REM*71
1Ø3Ø      :REM*8Ø
1Ø4Ø     :REM*136
```

A Dozen Will Do It, by Ronald Greenberg; June, p. 94.

Listing 1.

```
1ØØ     :REM*138
11Ø      :REM*62
12Ø     :REM*17Ø
13Ø     :REM*22Ø
14Ø      :REM*4Ø
15Ø     :REM*224
16Ø       :REM*4
17Ø     :REM*12Ø
18Ø      :REM*82
19Ø      :REM*68
2ØØ     :REM*228
21Ø     :REM*182
22Ø     :REM*17Ø
23Ø     :REM*2Ø4
24Ø     :REM*222
25Ø     :REM*1Ø6
26Ø      :REM*19
27Ø      :REM*95
28Ø      :REM*71
29Ø       :REM*5
3ØØ     :REM*255
31Ø     :REM*137
32Ø      :REM*75
33Ø     :REM*165
34Ø     :REM*151
35Ø     :REM*117
36Ø     :REM*199
37Ø       :REM*7
38Ø       :REM*9
39Ø     :REM*213
4ØØ     :REM*1Ø7
41Ø     :REM*235
42Ø     :REM*213
43Ø     :REM*2Ø5
44Ø       :REM*9
45Ø     :REM*215
46Ø     :REM*179
47Ø     :REM*185
48Ø      :REM*93
49Ø      :REM*17
5ØØ     :REM*213
51Ø      :REM*19
52Ø      :REM*42
53Ø      :REM*9Ø
54Ø      :REM*14
55Ø     :REM*176
56Ø      :REM*5Ø
57Ø     :REM*184
58Ø     :REM*134
59Ø     :REM*254
6ØØ     :REM*19Ø
61Ø      :REM*66
62Ø     :REM*2Ø4
63Ø     :REM*136
64Ø      :REM*2Ø
65Ø     :REM*194
66Ø      :REM*22
67Ø     :REM*118
68Ø      :REM*1Ø
69Ø     :REM*11Ø
7ØØ     :REM*1Ø2
71Ø     :REM*1ØØ
72Ø     :REM*14Ø
73Ø     :REM*148
74Ø      :REM*22
75Ø     :REM*138
76Ø      :REM*14
77Ø     :REM*169
78Ø      :REM*23
79Ø      :REM*41
8ØØ     :REM*175
81Ø     :REM*183
82Ø     :REM*135
83Ø     :REM*145
84Ø     :REM*139
85Ø     :REM*187
86Ø      :REM*43
87Ø      :REM*23
88Ø      :REM*31
89Ø      :REM*15
9ØØ     :REM*215
91Ø     :REM*137
92Ø     :REM*127
93Ø      :REM*23
94Ø      :REM*21
95Ø      :REM*57
96Ø     :REM*227
97Ø     :REM*179
98Ø     :REM*139
99Ø      :REM*33
1ØØØ     :REM*141
1Ø1Ø     :REM*2Ø1
1Ø2Ø      :REM*79
1Ø3Ø      :REM*12
1Ø4Ø     :REM*254
1Ø5Ø     :REM*198
1Ø6Ø     :REM*224
1Ø7Ø      :REM*92
1Ø8Ø      :REM*72
1Ø9Ø      :REM*26
11ØØ      :REM*96
111Ø      :REM*42
```

Listing 1 continued.

```
112Ø    :REM*184
113Ø     :REM*18
114Ø    :REM*1Ø8
115Ø    :REM*198
116Ø     :REM*34
117Ø    :REM*124
118Ø    :REM*184
119Ø    :REM*132
12ØØ     :REM*2Ø
121Ø    :REM*192
122Ø    :REM*1Ø6
123Ø     :REM*2Ø
124Ø    :REM*19Ø
125Ø    :REM*1Ø6
126Ø     :REM*42
```

Listing 2.

```
1Ø       :REM*Ø
2Ø      :REM*19Ø
3Ø      :REM*238
4Ø       :REM*26
5Ø      :REM*188
1ØØØ    :REM*127
1Ø12    :REM*189
1Ø24      :REM*Ø
1Ø36    :REM*254
1Ø48     :REM*54
1Ø6Ø     :REM*52
1Ø72    :REM*2ØØ
1Ø84    :REM*134
1Ø96     :REM*22
11Ø8    :REM*134
112Ø     :REM*5Ø
1132    :REM*184
1144    :REM*182
1156     :REM*18
1168    :REM*116
118Ø    :REM*112
1192     :REM*32
12Ø4     :REM*7Ø
1216    :REM*158
1228    :REM*124
124Ø     :REM*66
1252     :REM*68
1264    :REM*22Ø
1276    :REM*198
1288    :REM*1Ø3
```

Bad Blocks?, by Joseph Shaughnessy; June, p. 66.

```
1Ø       :REM*72
2Ø       :REM*7Ø
3Ø      :REM*188
4Ø       :REM*9Ø
5Ø      :REM*156
6Ø      :REM*11Ø
7Ø      :REM*216
8Ø      :REM*13Ø
9Ø      :REM*152
1ØØ     :REM*118
11Ø     :REM*116
12Ø     :REM*112
13Ø      :REM*42
14Ø      :REM*18
15Ø     :REM*2Ø8
16Ø      :REM*24
17Ø      :REM*42
18Ø      :REM*46
19Ø     :REM*224
2ØØ      :REM*76
21Ø     :REM*176
22Ø     :REM*248
23Ø      :REM*18
24Ø     :REM*148
25Ø     :REM*122
26Ø     :REM*219
27Ø       :REM*3
28Ø      :REM*19
29Ø      :REM*83
3ØØ     :REM*247
31Ø     :REM*249
32Ø      :REM*61
33Ø     :REM*139
34Ø      :REM*19
35Ø      :REM*51
36Ø     :REM*163
37Ø      :REM*39
38Ø      :REM*99
39Ø      :REM*47
4ØØ     :REM*197
41Ø       :REM*1
42Ø      :REM*97
43Ø      :REM*15
44Ø     :REM*211
45Ø     :REM*213
46Ø       :REM*9
47Ø      :REM*95
48Ø     :REM*1Ø5
49Ø     :REM*113
5ØØ     :REM*237
51Ø     :REM*177
52Ø     :REM*158
525      :REM*161
53Ø      :REM*14
54Ø     :REM*22Ø
55Ø      :REM*98
56Ø     :REM*2ØØ
57Ø      :REM*56
58Ø     :REM*128
59Ø     :REM*132
6ØØ      :REM*7Ø
61Ø     :REM*16Ø
62Ø      :REM*54
63Ø     :REM*134
64Ø      :REM*48
65Ø     :REM*226
66Ø     :REM*114
67Ø      :REM*62
68Ø      :REM*44
69Ø     :REM*222
7ØØ     :REM*1ØØ
71Ø      :REM*58
72Ø      :REM*86
73Ø      :REM*3Ø
74Ø     :REM*24Ø
75Ø     :REM*238
76Ø     :REM*25Ø
77Ø     :REM*243
78Ø       :REM*5
79Ø       :REM*7
8ØØ     :REM*1Ø5
81Ø     :REM*137
82Ø     :REM*217
83Ø      :REM*41
84Ø     :REM*1Ø7
85Ø     :REM*117
86Ø     :REM*237
87Ø      :REM*53
88Ø      :REM*75
89Ø     :REM*1Ø1
9ØØ     :REM*2Ø3
91Ø      :REM*31
92Ø      :REM*55
93Ø     :REM*245
94Ø     :REM*173
95Ø     :REM*113
96Ø     :REM*187
97Ø      :REM*13
98Ø     :REM*161
99Ø      :REM*33
1ØØØ     :REM*53
1Ø1Ø    :REM*197
1Ø2Ø     :REM*71
1Ø3Ø    :REM*152
1Ø4Ø     :REM*18
1Ø5Ø    :REM*162
1Ø6Ø    :REM*172
1Ø7Ø     :REM*98
1Ø8Ø    :REM*144
1Ø9Ø    :REM*218
11ØØ    :REM*168
111Ø    :REM*162
112Ø    :REM*162
113Ø    :REM*168
114Ø     :REM*16
115Ø     :REM*12
116Ø     :REM*58
117Ø      :REM*5Ø
118Ø    :REM*132
119Ø    :REM*116
12ØØ    :REM*228
121Ø    :REM*21Ø
122Ø      :REM*6Ø
123Ø    :REM*21Ø
124Ø    :REM*184
125Ø     :REM*58
126Ø    :REM*146
127Ø    :REM*2Ø4
128Ø    :REM*1Ø5
129Ø    :REM*133
13ØØ    :REM*147
131Ø    :REM*2Ø9
132Ø     :REM*69
133Ø     :REM*13
134Ø    :REM*153
135Ø    :REM*1Ø3
136Ø    :REM*161
137Ø     :REM*75
138Ø    :REM*179
139Ø    :REM*137
```

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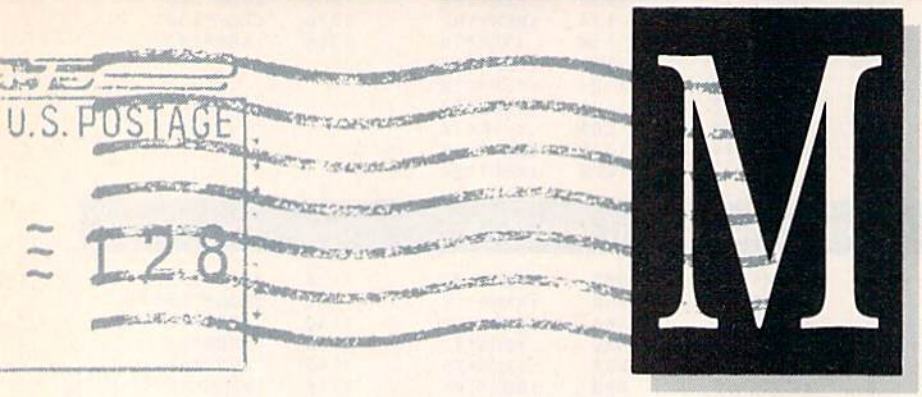

Patchwork Computing

I have thoroughly enjoyed your *RUN* magazine as the best all-around publication for Commodore computers. The many articles, Commodore Clinic, Mail RUN, even the ads have been a tremendous help to this new computer enthusiast.

I have typed in Mike Konshak's Datafile program with all its additions and was surprised and delighted when it not only worked to perfection, but greatly speeded up my own magazine's subscription listings and solved my renewal problems. I can't thank you enough—both your magazine and Mr. Konshak.

Now, I have a request. I'd like a program that would utilize Commodore's graphics capabilities by allowing me to create and print out quilt designs. Such a program could be used for many other applications beyond quilt design.

The program should be able to figure quilt-block sizes and to compute in inches a full-sized quilt (such as 80 × 100 = 24 complete blocks, etc.). Are there any programmers out there who have written such a program or would be willing to write one for this purpose?

Joan Emerson, Editor
Rogue's Gallery
Route #1
Cushing, WI 54006

Educating Teachers

I read with interest Margaret Morabito's education column, The Resource Center, in your February 1986 issue. My situation is not unlike the one at the Winchester school.

I also have a network of Commodore 64s in my classroom. I use the VIC Switch, Prowriter 8510A, Tymac's The Connection interface and eight C-64 computers. We are having great success with them, with both special education students and the general school population.

Due to the lack of software that would effectively utilize the network, I finally had to write my own programs and modify others to access all the features of the network, especially the printer. Several other teachers joined me in this project. This often meant modifying various public domain programs to make them fit the network. The result of this effort was the development of some very useful programs for elementary school students in math, reading and spelling.

Two of these programs, Quick Math and Quick Read, involve timing the students during specific drill in math and reading. We have been using the math program as a criterion reference screening test for the entire school—grades 1–6. Both programs have the ability to print out the results of each student's progress to the printer. This provides immediate feedback to the students and their teachers. I now have other schools using the program with success.

I think it would be great to receive more information from others like myself who have either developed or are using some excellent programs on their network. I would be willing to trade my work for theirs.

Rod B. Blaylock
Cloverdale Elementary School
3999 Greenwillow Ave.
Idaho Falls, ID 83401

I was very pleased to see Margaret Morabito's education column. Since receiving C-64s in November of 1983, I have spent an extremely frustrating two years trying to make constructive educational use of them. I have written to several publications concerning educational applications of computers—with little satisfaction. If I got any reply at all, it was a polite, "we don't have time for this topic." A few individuals and small businesses have been most helpful.

I hope that this column can exert an influence that will convince educators, other publishers and "the powers that be" at Commodore of the educational potential and value in Commodore computers. I firmly believe that the C-64 is the best computer buy for both education and personal use.

Leon Sullivan
Madisonville, KY

A Criminal Use

I am involved in the Wilkes-Barre Crime Prevention Unit, which is headed by Lt. Jerry Cookus, the president of the Pennsylvania Crime Prevention Officers Association.

For the past several months, our unit has been using a C-64 system to help us solve local crimes. Our police department has about 100 members, and we know, for the most part, who the bad guys are. The problem is that we don't know each problem case and often have to consult with one another about a suspect. This could take days. Our C-64 supplies us with the necessary information within seconds.

We are currently using a burglary file, a theft file and a suspect file. I

wrote these files with the help of a fine database, modified for crime-prevention purposes. I would like to speak with others who are using a microcomputer for similar applications. I'd like to see if we could combine efforts to develop a super system.

For those of you interested, contact Lt. Cookus, c/o Wilkes-Barre Police Department, Special Services, 35 North Washington St., Wilkes-Barre, PA 18701.

James J. Scutch
Wilkes-Barre, PA

Name Change

Thank you for listing our music program, Virtuoso, in the Software Buyer's Guide in your January 1986 issue. Unfortunately, the name we had chosen was already a registered trademark of Enhanced Technology Associates, Inc. Therefore, we have changed the name of our product to Euphony.

Jim Raymond
TOC Software
Fairbanks, AK

User's Group Corrections

In your 1986 Special Issue, the address for our club, the Commodore Houston User's Group, is incorrect. The correct address is PO Box 612, Tomball, TX 77375.

The modem number for our free, non-restricted BBS is 713-433-6395. The voice number for current meeting information is 713-630-3502.

Mary F. Howe, President
Commodore Houston User's Group

Please note that on p. 170 of your 1986 Special Issue, the telephone number listed under Commodore User's Group of Rochester is incorrect. The only means of contacting this group is by writing to PO Box 26514, Rochester, NY 14626.

Kathy Foley
Rochester, NY

Commodore Overseas

Please add our name to your list of overseas Commodore user's groups. We are a small but active group situated on the west coast of North Island, 50 miles north of Wellington.

We have been formed now for almost two years and have a membership of 98 C-64 and VIC-20 users; the C-128 has only just arrived on the market here, so we should have some users in the near future.

Any clubs in the United States who are interested in exchanging their publications with our publication, *SYNTAX ERROR?*, should contact us.

Murray E. Nicolson
Kapiti Commodore User's Group
16a Cypress Grove
Paraparaumu, New Zealand

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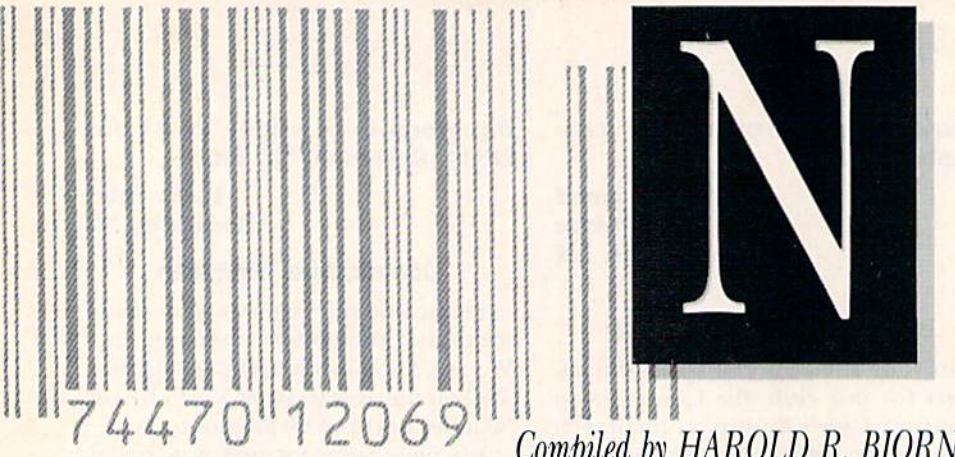


Compiled by HAROLD R. BJORNSEN

For Amway Product Distributors

Soft-pack is a multidisk software package for the beginner up to the Diamond Direct distributor.

The Product Order program allows you to order up to 1500 products per order and select them from over 860 products on file. Features include PV/BV and product order accumulations, variable handling-charge rates, hard-copy capabilities, up to 100 individual distributor files and variable state tax status for products and distributors.

The Expense/Home Budget program stores up to 2000 records for accurate accounting of business expenses and income ledgers. Available for the C-64 for $150. Uptown Enterprises, PO Box 226, Verona, VA 24482.

Check Reader Service number 400.

Chartpak-128

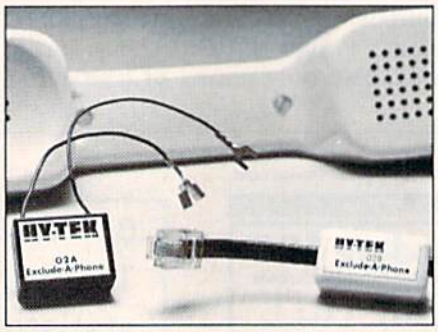
Now you can get the Chartpak for your C-128, the software that lets you create charts and high-resolution graphics without the need for any programming.

Chartpak-128 has the same data entry and data maintenance features as the C-64 version, and you can use the program's defaults to build professional-quality charts and graphs, or you can build them to your own specifications.

With your C-128, you get three times the resolution of the C-64 version, and you can view an entire chart or graph or scroll the screen to see the higher-resolution detail.

Chartpak-128 takes advantage of the extra memory of the C-128 so you can enter more data from which to build your charts. Available on disk for $39.95 from Abacus Software, 2201 Kalamazoo SE, PO Box 7211, Grand Rapids, MI 49510.

Check Reader Service number 404.



Exclude-A-Phone, from Hy-Tek.

Exclude-A-Phone

Tired of having someone pick up an extension phone and ruin your computer transmission? You can prevent this with Exclude-A-Phone, from Hy-Tek (c/o R. K. Burtchaell Co., 516 SE Morrison, Suite 201, Portland, OR 97214).

Exclude-A-Phone blocks an extension phone from interfering when the line is already in use. Installing the device is easy, and, if you wish, it may be kept out of sight. Available for $23.95.

Check Reader Service number 401.

"Freeware" from Florida

The Sharewaire Disk Volume 1 begins a series of "freeware" from Serendipity Software (8438 Lynda Sue Lane West, Jacksonville, FL 32217).

Volume 1 includes a fast-loading automatic menu program, a program for making disk envelopes, a postage scale program, a return-address label program, a crib-sheet program to use with the function keys on your C-64 or C-128 and a program that adds 15 commands to Basic to aid you in writing, entering and debugging Basic programs.

Sharewaire Disk Volume 1 is available for $15.

Check Reader Service number 402.

A Current Release

Lincad, a linear electronic circuit analysis and design program, has been released by Sofcad Electronics (PO Box 21845, Columbus, OH 43221).

The program has over 12 features, including interactive design, circuit optimization, ac worst-case analysis, minimization/maximization of circuit parameters and mechanical and electromechanical systems analysis.

The disk and manual are available for the C-64 for $49.

Check Reader Service number 405.

Headwipes

Headwipes, a pre-moistened applicator of nonabrasive, 100% rayon, cleans all disk drive pickups and recording heads (audio and video), tape guides, capstans and rollers, PC-board contacts and any components that need cleaning.

The applicator contains a solvent that dissolves dirt and oxides and evaporates without leaving a film or residue on components.

Headwipes is available in packages of ten for $3.75. Headwipes, PO Box 1125, Burbank, CA 91507.

Check Reader Service number 406.

Temperature Scanner

Electroworks (Bldg. One, Brown Road, Cornell Research Park, Ithaca, NY 14850) introduces its Model 20 two-channel temperature scanner for the C-64. The scanner's two program-selectable input channels measure temperatures from −20°C to 100°C, with an accuracy of ±0.5°C.

You can program your computer to display temperature in Fahrenheit or Celsius, record temperatures at predetermined intervals, set audible alarms for high/low limits and display and record the temperature differential between the scanner's two probes. Available for a cool $179.

Check Reader Service number 403.

Electroworks' Temperature Scanner.

Commodore Flea Market

The Price Buster (CAT Systems Publishing, 21115 Devonshire St., Chatsworth, CA 91311) is a monthly nationwide publication that lists computer equipment for sale by private parties.

You can place your ad via modem or the magazine's CompuServe or MCI mailbox. *The Price Buster* also publishes articles and programs. A one-year subscription (12 issues plus one free issue) is available for $9.

Check Reader Service number 412.

Baseball Stats Aid

The 43rd Street Software Shop (720 43rd St., Ashland, KY 41101) introduces At Bat Stats 64, a baseball statistics program for the C-64. Managers and coaches can track their team's performance during the season, and players can track their individual performances, including innings played, total at-bats, batting averages, slugging percentages, singles, doubles, triples, home runs and runs batted in.

In addition, At Bat records data for up to 162 games and 40 players, changes and reviews game and player data, prints out your team's schedule, team record, team season summary, and player and game summaries. Available on disk for $22.95.

Check Reader Service number 407.

Office Ensemble

A new line of computer furniture for your office, the Oak 160 Series from Bush Industries (PO Box 460, Jamestown, NY 14702), is made entirely of solid oak and oak laminates. Each piece features a distinctive pattern of accent lines and a hand-rubbed lacquered finish.

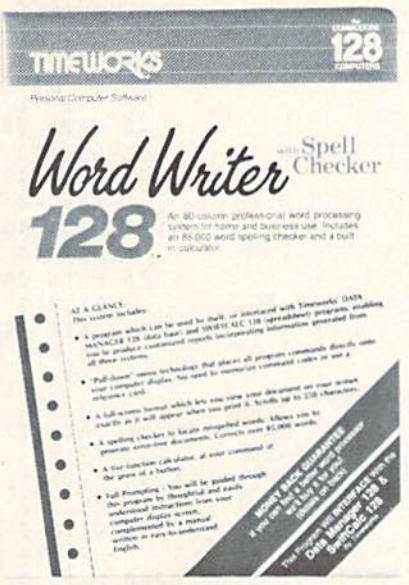
Included in this ensemble are a desk (which sets the keyboard at a 27-inch height and provides a 50- × 29-inch work surface; $199.95), a pedestal (which can be added to the desk to increase storage space; $140), a hutch (which has storage space for software, binders and accessories; $199.95) and a printer stand (which contains two top paper slots for both rear- and bottom-feed printers; $159.95).

Check Reader Service number 413.

Enhanced Word Writer 128

Timeworks (444 Lake Cook Road, Deerfield, IL 60015) has released an enhanced version of its Word Writer 128 program for the C-128.

The upgraded program, an 80-column professional word processing system for home and business use, works in 128 mode with either a 40- or 80-column monitor.



Timeworks' Enhanced Word Writer 128.

Additional features now include on-screen highlighting, which allows your printer to underline, italicize, boldface or use all three together and to view each highlight on-screen before printing out a hard copy; superscripts and subscripts; headers and footers; and speed keys, which let you access Word Writer's commands in a hurry.

The enhanced Word Writer 128 is available on disk for $69.95.

Check Reader Service number 408.

Printout of a musical composition (not to scale), using Dayline Software's Music Magic program.

Magical Musical Tour

Music Magic, a music composition program, releases the musical capabilities of your C-64 to your control.

You can create music and then listen to it as your computer plays it back and displays it on the screen. Then, with the Edit Song command, you can delete, add and replace notes and rests.

With Music Magic, you can also control both tempo and volume and design your own sounds. Available on disk for $30 from Dayline Software, PO Box 305, Ames, IA 50010.

Check Reader Service number 409.

A Monitor for Your C-128

C. Itoh Digital Products (19750 South Vermont, Suite 220, Torrance, CA 90502) introduces its CM1000 monitor, with both composite and RGB capabilities and a full-range speaker.

In Composite mode, the CM1000 provides the maximum resolution of 320 × 240, with a four MHz bandwidth. The RGB mode provides a resolution of 640 × 240, with a 15 MHz bandwidth.

The monitor can also be connected to your VCR or other video source. It is available for your C-128 for $499.

Check Reader Service number 411.

How to Type in C-64 and C-128 Listings from *RUN*

To simplify your typing of *RUN*'s C-64 and C-128 program listings, we include checksum numbers. These numbers follow a REM statement at the end of each line (e.g., :REM*123). These checksum numbers necessitate your using RUN's Perfect Typist programs, listed below. Use 64 Perfect Typist for C-64 programs and 128 Perfect Typist for 128 Mode programs on the C-128.

Type in 64 Perfect Typist (Listing 1) or 128 Perfect Typist (Listing 2) and save it to either tape or disk before running. When you want to type in a 64- or a 128-mode program, first load and run the appropriate Perfect Typist listing. Two SYS numbers will be displayed on your screen. Jot these down and keep them handy. They are the SYS numbers that you type in for deactivating and reactivating the checksum program.

After Perfect Typist has been loaded and run, start typing in the program listing from *RUN* as you normally do. The only difference is that now, after you press the return key to log in each line, a 1-, 2- or 3-digit number will appear below the line on the left margin. This is the checksum number, ranging from 0 to 255.

If this number matches the checksum number printed in the listing after the :REM*, then you know you have typed that line correctly. Then you type the next program line right over the previous line's checksum value. If the checksum numbers do not agree, analyze your line on screen for any typographic errors or omissions. Make the needed changes and press the return key again to log in those changes. A new checksum number will appear in place of the old one. Compare this to the magazine's number and then proceed to the next line.

When you've finished typing in your program, disable the Perfect Typist by typing in the appropriate SYS number for either 64 or 128 mode, and press the return key. Now you can save your program as usual, to disk or tape. (Before you attempt to run your new program, turn your computer off and back on to completely clear out the Perfect Typist program.)

You may save an incomplete program any time and continue it later. You will have to reload and run the Perfect Typist program, then load the incompleted program that you were working on, list it, and continue where you left off.

The 128 Perfect Typist will work in either 40 or 80 columns. Also, it lets you use the C-128's automatic line-numbering. If Auto is on, the checksum will be printed below the line you just entered, and the C-128 will place the next line number below the checksum.

All listings in *RUN* have been translated so that the graphics and control characters are designated as understandable key combinations. When you see instructions inside curly brackets, such as {SHIFT L}, you should hold down the shift key and press the L key. What you see on your screen will look quite different from what is designated inside the brackets. Another example is {22 SPACEs}, which instructs you to press the space bar 22 times.

Listing 1. *64 Perfect Typist program.*

```
1 REM 64 PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17Ø13
7 REM
1Ø POKE56,PEEK(56)-1:POKE52,PEEK(56):CLR
2Ø PG=PEEK(56):ML=PG*256+6Ø
3Ø FORX=ML TO ML+154:READD:T=T+D:POKEX,D:NE
   XT
4Ø IFT<>16251 THEN PRINT"ERROR IN DATA...":
   END
6Ø POKEML+4,PG:POKE ML+1Ø,PG:POKE ML+16,PG
7Ø POKE ML+2Ø,PG:POKE ML+32,PG:POKE ML+38,P
   G
8Ø POKE ML+141,PG
89 PRINT"{SHFT CLR}{CRSR RT}**************
   **********************"
9Ø SYS ML:PRINT "{CRSR RT}** 64 PERFECT TYP
   IST IS NOW ACTIVE{2 SPACEs}**"
1ØØ PRINT "{CRSR RT}** SYS"ML"=ON{5 SPACEs}
    SYS"ML+3Ø"=OFF **"
1Ø1 PRINT"{CRSR RT}**********************
    *************":NEW
11Ø DATA 173,ØØ5,ØØ3,2Ø1,ØØ3,2Ø8,ØØ1,Ø96
12Ø DATA 141,1Ø5,ØØ3,173,ØØ4,ØØ3,141,1Ø4
13Ø DATA ØØ3,162,1Ø3,16Ø,ØØ3,142,ØØ4,ØØ3
14Ø DATA 14Ø,ØØ5,ØØ3,Ø96,234,234,173,1Ø4
15Ø DATA ØØ3,141,ØØ4,ØØ3,173,1Ø5,ØØ3,141
16Ø DATA ØØ5,ØØ3,Ø96,Ø32,124,165,132,Ø11
17Ø DATA 162,ØØØ,142,24Ø,ØØ3,142,241,ØØ3
18Ø DATA 189,ØØØ,ØØ2,24Ø,Ø51,2Ø1,Ø32,2Ø8
19Ø DATA ØØ4,164,212,24Ø,Ø4Ø,2Ø1,Ø34,2Ø8
2ØØ DATA ØØ8,Ø72,165,212,Ø73,ØØ1,133,212
21Ø DATA 1Ø4,Ø72,238,241,ØØ3,173,241,ØØ3
22Ø DATA Ø41,ØØ7,168,1Ø4,Ø24,Ø72,Ø24,1Ø4
23Ø DATA Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1Ø9
24Ø DATA 24Ø,ØØ3,141,24Ø,ØØ3,232,2Ø8,2ØØ
25Ø DATA 173,24Ø,ØØ3,Ø24,1Ø1,Ø2Ø,Ø24,1Ø1
26Ø DATA Ø21,141,24Ø,ØØ3,169,Ø42,Ø32,21Ø
27Ø DATA 255,169,ØØØ,174,24Ø,ØØ3,Ø32,2Ø5
28Ø DATA 189,162,ØØ3,189,211,ØØ3,Ø32,21Ø
29Ø DATA 255,2Ø2,Ø16,247,164,Ø11,Ø96,145
3ØØ DATA Ø13,Ø32,Ø32
```

Listing 2. *128 Perfect Typist program.*

```
1 REM 4Ø/8Ø COL 128 MODE PERFECT TYPIST
2 REM
3 REM WRITTEN BY:
4 REM JAMES E. BORDEN
5 REM 641 ADAMS ROAD
6 REM CARLISLE, PA 17Ø13
7 REM
1Ø FORX=512ØTO5379:READD:T=T+D:POKEX,D:NEXT
2Ø IFT<>28312 THENPRINT"{2 CRSR DNs}ERROR I
   N DATA...":END
25 A$="":IFPEEK(215)=128THENA$="{2Ø SPACEs}
   "
3Ø PRINT"{SHFT CLR}"A$"{CRSR RT}**********
   **************************"
4Ø PRINTA$"{CRSR RT}** 128 PERFECT TYPIST I
   S NOW ACTIVE **"
5Ø PRINTA$"{CRSR RT}**{2 SPACEs}SYS 512Ø=ON
   {7 SPACEs}SYS 515Ø=OFF{2 SPACEs}**"
6Ø PRINTA$"{CRSR RT}**********************
   ***************":SYS512Ø:NEW
512Ø DATA 173,ØØ5,ØØ3,2Ø1,Ø2Ø,2Ø8,ØØ1,Ø96,1
     41,Ø45
513Ø DATA Ø2Ø,173,ØØ4,ØØ3,141,Ø44,Ø2Ø,162,Ø
     43,16Ø
514Ø DATA Ø2Ø,142,ØØ4,ØØ3,14Ø,ØØ5,ØØ3,Ø96,2
     34,234
515Ø DATA 173,Ø44,Ø2Ø,141,ØØ4,ØØ3,173,Ø45,Ø
     2Ø,141
516Ø DATA ØØ5,ØØ3,Ø96,Ø32,Ø13,Ø67,14Ø,255,Ø
     19,162
517Ø DATA ØØØ,142,252,Ø19,142,253,Ø19,142,2
     54,Ø19
518Ø DATA 189,ØØØ,ØØ2,2Ø1,Ø32,24Ø,ØØ8,2Ø1,Ø
     48,144
519Ø DATA ØØ7,2Ø1,Ø58,176,ØØ3,232,2Ø8,238,1
     89,ØØØ
52ØØ DATA ØØ2,24Ø,Ø54,2Ø1,Ø32,2Ø8,ØØ5,172,2
     54,Ø19
521Ø DATA 24Ø,Ø42,2Ø1,Ø34,2Ø8,Ø1Ø,Ø72,173,2
     54,Ø19
522Ø DATA Ø73,ØØ1,141,254,Ø19,1Ø4,Ø72,238,2
     53,Ø19
523Ø DATA 173,253,Ø19,Ø41,ØØ7,168,1Ø4,Ø24,Ø
     72,Ø24
524Ø DATA 1Ø4,Ø16,ØØ1,Ø56,Ø42,136,Ø16,246,1
     Ø9,252
525Ø DATA Ø19,141,252,Ø19,232,2Ø8,197,173,2
     52,Ø19
526Ø DATA Ø24,1Ø1,Ø22,Ø24,1Ø1,Ø23,141,252,Ø
     19,169
```

```
527Ø DATA Ø42,Ø32,241,Ø2Ø,Ø32,188,Ø2Ø,16Ø,Ø
     Ø2,185
528Ø DATA 185,Ø2Ø,Ø32,241,Ø2Ø,136,Ø16,247,1
     65,116
529Ø DATA 2Ø8,ØØ9,165,117,2Ø8,ØØ5,169,145,Ø
     32,241
53ØØ DATA Ø2Ø,172,255,Ø19,Ø96,Ø13,Ø32,Ø32,1
     62,ØØØ
531Ø DATA 173,252,Ø19,232,Ø56,233,1ØØ,176,2
     5Ø,1Ø5
532Ø DATA 1ØØ,2Ø2,24Ø,ØØ3,Ø32,232,Ø2Ø,2Ø1,Ø
     1Ø,176
533Ø DATA ØØ5,2Ø5,252,Ø19,24Ø,Ø15,162,ØØØ,2
     32,Ø56
534Ø DATA 233,Ø1Ø,Ø16,25Ø,Ø24,1Ø5,Ø1Ø,2Ø2,Ø
     32,232
535Ø DATA Ø2Ø,17Ø,Ø72,138,ØØ9,Ø48,Ø32,241,Ø
     2Ø,1Ø4
536Ø DATA Ø96,17Ø,173,ØØØ,255,Ø72,169,ØØØ,1
     41,ØØØ
537Ø DATA 255,138,Ø32,21Ø,255,1Ø4,141,ØØØ,2
     55,Ø96
```

The RUNning Board

RUN invites you to contact its bulletin board (RUNning Board). In addition to up-to-date information about *RUN* and the Commodore industry, the RUNning Board now presents useful computing hints and tips, corrections and updates to published articles, user's group information, an up-to-date list of selections for ReRUN and sneak previews of upcoming articles.

The RUNning Board also features a menu format that makes it easier and faster for you to select a specific section of the bulletin board. We use a standard protocol, 300 baud, one stop-bit, no parity, full duplex and a word length of eight bits.

The RUNning Board is definitely worth a call. You can get on-line anytime, 24 hours a day, seven days a week, by dialing our new number: 603-924-9704.

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RUN AMOK

Item: There is a bug in Michael Broussard's Lister program (Add Elegance to Your Program Listings, January 1986, p. 74). The Commodore graphics characters contained within quoted strings do not get printed properly. This can be corrected by adding the following lines to the Lister Basic loader:

```
185 POKE 49523,76 : POKE 49524,56 : POKE 49525,199
187 FOR K = 51000 to 51009 : READ N : POKE K,N : NEXT
1700 DATA 208,4,138,76,118,193,138,76,232,193
```

Lister also does not work properly for a program that has multiple NEXT statements for a single FOR. Turning off Lister's loop-indentation feature solves this problem; this is accomplished by adding this line to the Basic loader:

```
188 POKE 49540,0 : POKE 49624,0
```

Item: There was an omission from a line of code in Commodore Clinic for March 1986. In the answer at the bottom of column 1, p. 101, the Print statement should read:

PRINT#15"N0:DISK NAME,##"<return>

Item: Our attention has been called to a minor error in the listing of the Home Run Derby program (December 1985, p.34). In line 250, RE>BE should read RE>BL. The error doesn't interfere with the game play, but causes "GOOD GAME RED" to appear after the last inning, whether or not Red is the winner.

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June

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■ **Review of GEOS**—You'll want to know about this exciting new operating system Berkeley Software has produced for the C-64. GEOS offers icons, pull-down menus and windowing features.

■ **Educational Computing**—Next month's issue will feature an interesting section on education and computers:

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—Education in Canada. Commodore has a strong hold on Canada's education market and shows no signs of letting go. Find out the company's secrets.

—Arithme-Sketch. This unique math program rewards correct answers with free drawing time.

—What does it mean to be a manufacturer of educational software in a rapidly expanding market? You'll find the answers to this and similar probing questions in an interview with the vice-president of Grolier Electronic Publishing.

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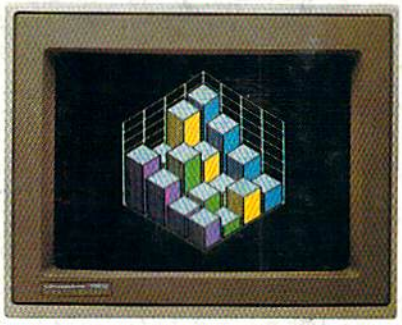
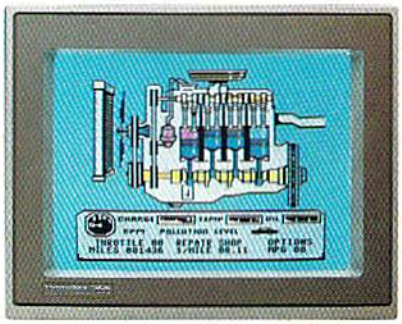


graph a spreadsheet

write a novel



fix an engine

compose a song

paint a picture

your banking

learn to fly

organize a data base

tell a story

forecast sales

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